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ruiter's Raid Results in Raises

By E. Drake Lundell Jr.
Of the CW Staff

DES MOINES, Iowa — DP employees of Dial Computer Systems Corp. here are taking home fatter paychecks now as a result of a "raid" on the company by an executive recruiting firm hired by American Airlines.

In addition, 10 former employees of Dial's DP center are making between $3,000 and $5,000 more yearly because they responded to the recruiter's efforts.

But the heyday may be over, because the Dial chairman complained loudly and publicly about the American practice of offering his employees more money, and American, which just began serving the Des Moines area, didn't want to ruffle any local feathers.

The whole brouhaha started because Dial uses the Airline Control Program in its on-line network, which is patterned after airline reservation systems, according to Joe Wahrer, president of Dial Computer.

Therefore, the skills of the employees in the organization were directly transferable to the airline's environment and, when American signed on an executive recruiter to find such people, they immediately showed up at Dial.

Although Wahrer now says the people

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Let Carriers Offer DP, FCC Inquiry Told

Users Say Services Suffer When Innovation Inhibited

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Users want to see communications common carriers provide terminal equipment capable of information processing as well as other DP services, according to comments filed with the Federal Communications Commission (FCC) here last week in connection with its second Computer Inquiry.

The chief concern of the Ad Hoc Telecommunications Users Committee, representing 15 user companies ranging from Bethlehem Steel Corp. and Shell Oil Co. to Ford Motor Co. and Sears, Roebuck and Co., is that carriers not be limited in their ability to innovate in providing new communications services to meet user needs.

Prohibitions against carriers' entry into the unregulated DP market through their communications business should be framed in terms of "the purpose and effect of the services provided" rather than the processes or equipment employed, the user group stated.

"Technological segregation, a prohibition against the use of new technology for communications purposes" by the FCC through regulations preventing carriers from using certain processes or kinds of equipment, is contrary to the regulatory agency's essential purpose and to the Communications Act of 1934, the committee asserted.

The public will suffer if carriers are not "encouraged to effect and accelerate technological innovations in order to protect and ensure an efficient communications service," the group added.

AT&T is at the top of the list of those carriers the user representative would like to see innovating.

"It is extremely important to users that the considerable talents of

(Continued on Page 6)

Vendors Want Competition But No Cross-Subsidies

WASHINGTON, D.C. — The Federal Communications Commission (FCC) should deregulate the communications common carriers to the point where they can provide data processing services, according to several trade associations and manufacturers of communications and DP equipment that filed comments here last week in the agency's second Computer Inquiry.

However, common carriers should not be allowed to subsidize DP activities with more established and profitable communications services, many companies and associations added.

Most of the nearly 50 organizations participating in the FCC proceeding perceived the heart of the Inquiry as establishing the distinction between regulated communications services and the unregulated DP service field, "in light of present technology."

A secondary issue raised by many Inquiry participants was whether common carriers with significant monopoly resources, particularly AT&T, should be permitted to supply terminal equipment in competitive markets.

Only the White House Office of Telecommunications Policy (OTP) questioned the basis of the FCC Inquiry, arguing that if this study is to be useful, it must be expanded "to identify the essential economic and social justification for commission intervention through regulation in all or part of the industry."

The FCC should ask, "Where would the government regulate the rapidly converging data processing and telecommunications fields?" OTP said. Any lesser question will not provide the certainty the FCC needs to guide this fast-growing segment of the economy, the office added.

Nearly all of the companies and associations contributing their comments to the Inquiry, however, agreed the technology changes of the last six years make a new study of the FCC-regulated industry essential.

The first Computer Inquiry, held in 1971, led to the FCC decision to adopt regulations preventing cross-subsidy between carriers' regulated offerings and their unregulated DP activities by requiring such companies to establish corporate siblings for the DP ventures.

Most second Inquiry participants applauded the success thus far of the "maximum separation" policy with respect to DP and communications. AT&T lent its support as well to the principle that "no unfair advantages should accrue to carriers which provide DP services on an unregulated basis or to their customers."

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With Recent Price Changes

Users Get More Choices for Their Money

By Molly Upton
Of the CW Staff

After all the recent churning in major mainframe prices, the net effect is that the user now has a wider range of system choices within a narrower price range, according to a recent *Computerworld* survey.

IBM's price cuts in MOS memory and the purchase prices of some of its systems make IBM systems more competitive in price/performance with those of the other mainframe manufacturers — despite attempts of those firms to cut their prices along with IBM.

Previously, the IBM machines had been priced — in some cases significantly — above those of their competition, but now that the dust has settled it appears the IBM 370/148, 370/158 and 370/168 are nestled in the same price range as their competitors.

Most of the mainframers cooperated with the survey and the figures are theirs. However, Itel is excluded because the firm refused to give any pricing information on its AS/4 and AS/5 systems.

The Higher End

Many of the pricing actions for machines competing in the range of the 370/148 to 168-3 occurred in the higher end. A look at prices for systems in the 4M-byte 168-3 range shows changes by IBM, Burroughs Corp., Honeywell Information Systems, Inc. and Amdahl Corp.

In the 158 area, IBM alone dropped its price to join the tight price grouping already occupied by Burroughs, HIS and Univac.

Univac was the only mainframer besides IBM to adjust prices in the 148 range, although Control Data Corp. did introduce its Omega 480 I and II plug-compatible CPUs.

HIS reduced prices on memory above 2M bytes, but did not see the need to change them at the 2M-byte configuration level, according to Richard Schnakenberg, manager of market programs for large-scale systems.

Univac lowered prices on its 90/60, thus increasing the gap between it and the 148. It also cut 30% off memory prices for systems above 1M byte, as did IBM on the 148. With the exception of some new packages on the 1100 series, Univac left its other systems' prices unchanged.

In the larger machine area, Amdahl Corp. reacted almost instantaneously to IBM's price cuts by reducing the price of its 470V/6-II and introducing new models, the V/7 and the V/5 [CW, April 4]. Burroughs lowered the price of its B7811, which it said competes with the 370/168-3.

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'On-Line = Savings' Not Just a Cliche, Informal Study Finds

By Don Leavitt
Of the CW Staff

SAN FRANCISCO — That savings can be realized through installation of on-line programming support has become almost a cliche. But an informal study has now been completed that appears to show exactly where and why the hard dollar gains show up.

On the average, a 41% improvement in programmer productivity is one of the primary benefits accruing to an organization that installs such a system, and much of that gain comes about through a cutback in the amount of waiting and walking the programmers have to do, according to the study.

In one specific location where a time-and-

(Continued on Page 4)

Proposed Energy Department Seen Tightening Data Collection

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — The Carter Administration's bid to create a Department of Energy (DOE) can result in the more efficient collection of numbers on energy reserves, needs and consumption, according to John D. Christie, assistant administrator for energy information and analysis at the Federal Energy Administration (FEA).

Approximately 200 federal data systems currently take one form of energy measurement or another, and between 50 and 60 of these systems are operating at the FEA alone, Christie said. If approved by Congress, the Energy Information Administration within the proposed Department of Energy could do much to improve cooperation between data collection efforts at today's independent federal energy-related agencies, he suggested.

How the various pieces of hardware, software and people will fit together under the Energy Information Administration is still anyone's guess, Christie stated. What is certain, however, is that the new Cabinet-level department "won't be a boon to the computer industry," he noted, since most of the necessary systems are already in place.

Christie, who is responsible for the data

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A special feature on computers and energy begins on Page 26.

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AT&T Opening Second Front?

State-Level 'Bell Bills' Cropping Up

By Ronald A. Frank
Of the CW Staff

Evidence is growing that the telephone industry is planning to open a second front in its battle to stop competition.

Having met with limited success in Congress for its Consumer Communications Reform Act, Bell may now be gearing up for similar efforts in the state legislatures, according to industry sources.

Although still limited in scope, anticompetitive bills have been introduced in two states, Massachusetts and Minnesota. Resolutions which support the basic provisions of the Bell-sponsored Reform Act now pending in Congress have been introduced in at least five other state legislatures.

AT&T officials are reported to be disappointed that congressional efforts have now turned to longer range telecommunications issues related to the future role of the Federal Communications Commission and competition in general. Congressional legislators, including Rep. Tim Wirth (D-Colo.), have predicted that the Reform Act is dead for at least this session of Congress, pending results of telecommunications studies now being undertaken by subcommittees in both houses of Congress.

It is against this backdrop of uncertainty on the national level that the Bell System may be turning its attention to the state legislatures. Spokesmen for procompetitive organizations concede privately that the state threat poses a serious challenge because many of the interconnection organizations do not have the resources to fight Bell in multiple legislatures.

In both Massachusetts and Minnesota, the anticompetition legislation was introduced at the request of local unions for phone company workers. The Massachusetts bill was introduced last January and subsequent hearings saw strong support given by the International Brotherhood of Electrical Workers (IBEW).

In Minnesota, the Communications Workers of America backed the proposed legislation.

At hearings on the proposal in March in Massachusetts, New England Telephone Co. officials reportedly coached IBEW representatives on the correct ways to support the bill.

An AT&T spokesman said the Massachusetts bill was "definitely not a company-sponsored effort on the part of New England Telephone Co." The operating company has been neutral and has made no appearances for or against the legislation, he said.

He acknowledged, however, that the IBEW had been behind the bill and that this union is a major telephone employee union in the area.

In addition to the proposed legislation, resolutions supporting the Reform Act and urging Congress to deal with the issues it raises, have been passed in California, Wyoming, Utah and South Dakota. An attempt to get a similar resolution passed in the Arizona legislature was defeated, according to a spokesman for the North American Telephone Association, an organization of independent telephone equipment vendors.

In the Massachusetts and Minnesota bills, the intent is to ensure that companies supplying equipment which attaches to the telephone network will be regulated by state regulatory commissions in the same manner as the telephone companies are regulated. In the Massachusetts bill, there is also a provision requiring regulated independent companies to provide equipment at the same rates charged by the telephone company.

Asked whether the Bell System is involved in the legislative effort in the various states, the AT&T spokesman said, "This is not necessarily just a Bell effort." He characterized it as a program by the telephone industry in the same way that the Reform Act had been the result of an industry campaign.

There are many states where resolutions have not been introduced, and the only way to get an accurate appraisal would be to look at the situation on a state-by-state basis, he added.

Asked if any Bell operating companies were responsible for the introduction of the resolutions, the spokesman said they were, along with other telephone companies.

He indicated, however, that it was not clear to him whether Bell operating companies had been involved with the two anticompetition bills now pending in Massachusetts and Minnesota. The Bell System companies certainly support the legislation, as well as the resolutions, he added.

AT&T Still Trying

WASHINGTON, D.C. — AT&T has asked the full nine-member panel of the U.S. Court of Appeals here to reconsider its request to review the November decision by Judge Joseph C. Waddy that found the Justice Department does have jurisdiction in the U.S. vs. AT&T antitrust suit.

A two-judge appeals court panel recently declined to review Waddy's decision [CW, June 6].

AT&T's move was seen by observers as a last attempt to stop the Justice Department suit without going to the Supreme Court. AT&T has argued that as a regulated carrier it is subject to regulation by the Federal Communications Commission and is not susceptible to antitrust charges.

On the Inside This Week

IBM Lawyer Accepts Post With Senate Antitrust Unit

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — An attorney who is representing IBM in the government's ongoing antitrust case against the corporation, will become staff director and chief counsel of the Senate Antitrust and Monopoly Subcommittee here.

David Boies, a partner in Cravath, Swaine and Moore the New York law firm retained by IBM to coordinate its defense in numerous antitrust suits, including the one filed by California Computer Products, Inc. — plans to begin working for the subcommittee about Sept. 30.

Asked by subcommittee chairman Sen. Edward Kennedy (D-Mass.) to take the job, Boise said he is looking forward to it, but will not leave New York until his responsibilities on U.S. vs. IBM end.

He is scheduled to cross-examine the government's economic witnesses including the Justice Department's chief economic advisor on the case, Dr. Alan McAdams of Cornell University.

The government expects to finish the presentation of its case against IBM by late August or early September and, "for the first time during the trail, I believe them," Boies stated.

Will Maintain Objectivity

Boies will exempt himself from any of the subcommittee's work concerned with U.S. vs. IBM, he said, adding Kennedy accepted this prohibition. In fact, if Boies hadn't insisted on this, the senator would have, he noted.

"I don't think it's possible for someone to be objective about a case he's been personally involved in," Boies commented. "Even if I thought such objectivity were possible, no one would believe I was objective about the suit."

Boies indicated he was first approached about the job two or three months ago by people representing Kennedy.

At that time, Boies was still in California in connection with his role as lead defense counsel for the trial of Calcomp vs. IBM. It was not then clear as to when the government's presentation of its evidence in New York would conclude.

"My initial reaction was that I just couldn't do it," the lawyer said.

Boies expects to be with the subcommittee for anywhere from 18 to 30 months and to return to Cravath, Swaine and Moore afterwards, although he acknowledged other opportunities might present themselves in the meantime.

The "substantial salary cut" he will experience with his new job is just "part of public service," Boies said.

Wisconsin, California Continue Battle Over Software Sales Tax

By Molly Upton
Of the CW Staff

Two more skirmishes in the battle against state software taxes occurred last week — one in Madison, Wis., the other in Burlingame, Calif.

By a vote of 80 to 19, the Wisconsin State legislative assembly disapproved and sent to caucus a provision that would have assessed sales taxes on a variety of DP services estimated by the bill's proponents to yield $9 million on total sales of $225 million.

The action was seen as a strategic move that would place legislators on the record against the bill while enabling them to support it in caucus, thus propelling it toward possible final approval, according to Michael Zeidler, a consultant.

Zeidler believes the assembly "blundered" in estimating the potential revenues the tax law would produce. He has written to the legislators detailing his reasons.

In Burlingame, Calif., representatives of more than 100 DP firms pledged more than $10,000 toward efforts to eliminate retroactive aspects of sales taxes on software and DP services and fight for a revamping of that state's tax laws, according to Donald Mulvey, chairman of the Sales Tax Action Group (Stag).

Stag will seek a hearing before the state board of equalization about the application of the sales tax and will work toward new regulations since the current ones are "fuzzy" and somewhat outdated, he said.

The group has hired attorney Steve Hollman for assistance, according to Mulvey, who can be reached at Computer Services Associates, P.O. Box 13172, Oakland, Calif. 94661.

Back in Wisconsin

The vote by the Wisconsin assembly sent to caucus Bill No. 77.52 (2) (a) (13), which would have subjected "the sale of computer and DP services, including time-sharing, designing or converting systems, programming, consulting, training, reformatting of data and computer printing" to sales tax.

Consultant Zeidler strongly disagrees with estimates by the bill's proponents regarding the revenue base that would yield the estimated $9 million in taxes.

In a letter to the senators, he indicated the $225 million estimate is off by about $195 million. Zeidler theorized that the $225 million figures must have included all types of DP businesses, including equipment vendors that are already paying sales taxes, he said.

He further deduced that because some of the services, such as keypunching, are already paying sales tax, the 4% tax would yield only $1.4 million for two years.

Zeidler also warned of the possibility of substantial costs in administering and collecting the tax, which could conceivably total $2 million in the two years.

Raid Results in Raises

(Continued from Page 1)

in the DP operation were "competitively paid" before the recruiters came around, he admitted Dial has increased the salaries of people in the department to match the American offers which ran $3,000 to $5,000 more a year.

American said it stopped the practice because of the adverse publicity generated by Dial Chairman Edward Glazer, who not only complained directly to American, but took his complaints of "piracy" to the local papers.

American said it would still consider hiring other employees from Dial if they came on their own, but the airline was no longer recruiting them.

Dial now says it does not object to paying people more, but it objects to the methods used by the recruiters who contacted the Dial DP personnel "en masse" and "during working hours," according to Wahrer.

"We recognize the right of any employee to go where he or she likes," Wahrer said. However, he "objected" to the way the contacts were handled.

The American move "could have been crippling," Wahrer admitted, "if American had gotten everybody they wanted."

Asked if he received a raise by the moves, Wahrer said "no, but I think I'll bring it up".

Analysis Finds On-Line Support Boosts Programmer Output 41%

(Continued from Page 1)

motion analysis was undertaken, the elimination of excess walking would be more than enough to pay for the terminals needed to implement the on-line support, the study found.

The attempt to document the benefits of on-line programming was made by Gary Bailey of Pansophic Systems, Inc.'s office here, admittedly to enhance his presentations of the on-line features of Panvalet, Pansophic's source program library system. But the results of the study can "certainly be used to support" the acquisition of any similar system, he said.

To give his analysis strucure, Bailey proposed that all the time spent by a programming staff can be divided into three basic classifications — thinking, writing and waiting. Data provided by some of his prospects showed the actual division follows nearly the same proportions in all cases, he added.

Thinking — which covers evaluation of approaches to a problem and the planning of test and run procedures — accounts for 30% of the programmer's time. Writing — handwriting, printing on coding sheets or keypunching and preparing JCL — accounts for another 30% of a staffer's time, according to Bailey.

And waiting — waiting for keypunching, waiting for production/control runs, waiting or searching for listings and walking between work locations — takes up the remaining 40% of the programmer's day, the study indicated.

On-line programming would have no effect on the "thinking" portion of this workload, Bailey acknowledged, but should cut the "writing" 30%.

The greatest improvement, however, would come from a reduction in the "waiting" time. All the waiting for keypunch, for production/control runs and for listings is eliminated by going on-line, he claimed.

Much of the walking disappears too, leading to an 80% reduction in this part of the programmer's work day, the study said.

The "walking cost" of the batch-oriented staff of 20 programmers in the installation Bailey studied in depth ranges from $1,911- to $7,350/mo depending on the number of trips taken by each staffer and how long each trip lasted.

Each programmer typically made eight to 10 trips away from his desk each day and they lasted from five to 15 minutes each. All that walking would be unnecessary and could be eliminated in an on-line programming environment, Bailey said.

The dollar costs of that excessive walking were calculated on an average hourly salary of $7 and an average of 21 work days per month, he explained.

Estimating that eight IBM 3270 terminals would be enough to support this staff of 20 and would cost a total of $1,200/mo, Bailey said the dollar saving with the terminals in place (but not accounting for the cost of whatever software is needed) would be $711- to $6,150/mo in that instance.

The numbers might differ from place to place but the analysis technique should be generally applicable, he added.

Copies of Bailey's study are available from Pansophic's headquarters at 709 Enterprise Drive, Oak Brook, Ill. 60521.

FEA Crunches Energy Data Under DP Service Contract

WASHINGTON, D.C. — How does the Federal Energy Administration (FEA) go about crunching the energy numbers it collects from industry and the public and those it creates through modeling?

For the bulk of its brief three-and-a-half-year history, the agency has contracted out for its computer support. FEA has had a facilities management arrangement with Optimum Systems, Inc. (OSI) for two years, according to Albert Linden, deputy assistant administrator for data services in FEA's Office of Energy Information and Analysis.

The administration is currently examining a move to full services support that would include limited applications programming, some operating system support and keypunch assistance, Linden said.

At the moment, OSI owns and operates for FEA two IBM 370/168s which are multiprocessors running under MVS. One of these machines has 4M bytes of main memory; the other, 3M bytes, the deputy assistant administrator explained.

FEA has 13 billion characters of on-line storage available to it on IBM 3350 disks. The system also employs nine Storage Technology tape drives, Linden said.

Two Comten front ends satisfy FEA's telecommunications needs, and OSI has two IBM 1403 printers available to the agency at its computing site.

Finally the system supports two remote facilities, and Linden noted the agency is just converting from three Data 100 terminals to two Harris terminals at each of those stations. The stations themselves are primarily remote job entry facilities.

In considering a change to full service support, FEA has proposed to the General Services Administration (GSA) that a three-stage procurement process be conducted, Linden stated.

GSA is now reviewing the plan which would invite contractors to make an in-depth analysis of FEA's DP needs. The contractors would then be asked to explain how they would meet those requirements, and FEA would select one or two of these vendors to provide its DP support, Linden said.

FEA hopes to have this full services support sometime in fiscal year 1978, Linden said.

Energy Department Seen Helpful

(Continued from Page 1)

gathering, analysis and forecasting functions of FEA and who oversees the National Energy Information Center that serves as a national energy data clearinghouse, indicated the management information systems contained in the President's energy plan would merely affirm and expand what FEA is already doing.

Proposed at the end of April, the President's plan calls for "more detailed and reliable information on oil and gas reserves, on oil company operations and on local energy supplies and demand."

To meet these needs, a three-part energy information program would be established, consisting of a Petroleum Production and Reserve Information System, a Petroleum Company Financial Data System and an Emergency Management Information System, according to "The National Energy Plan" put out by President Carter's energy policy and planning group.

Under the Petroleum Production and Reserve Information System, the federal government would assume the data collection responsibilities now performed by the American Gas Association and the American Petroleum Institute. The oil and gas industries would be required to open their reserve estimation processes to federal officials, the plan said.

All large companies and a sample of small firms engaged in the oil or gas business would be required to submit detailed financial information under the Petroleum Company Financial Data System, the energy plan stated.

Companies would have to conform to specified accounting principles and to report capital expenditures and operating results by geographical region and type of fuel. They would be required to submit information relating to functional areas, including refining, production, marketing and distribution, as well as data relating to foreign operations, according to the plan.

The final part of the President's proposed information program is the Emergency Management Information System, which would provide local, state and federal governments with up-to-date information on local energy supplies and consumption.

"Such information is needed to respond if there should be an interruption of foreign oil supply, a natural gas shortage or other energy emergencies," the plan said.

Once again, the system the President proposes is likely to be built on the emergency data collection system already in existence at FEA.

Weak Link

Christie acknowledged the weak element in today's data collection system is the inability to determine how much energy people in the residential sector use and for what purposes.

The President's plan does not prescribe the means by which the Energy Information Administration will monitor the conservation efforts of the American public.

In terms of aggregate energy data, FEA relates national energy consumption to the gross national product (GNP) every quarter, Christie said. He suggested that information from the transportation sector might be used to evaluate progress on conservation programs for individuals and noted that FEA already collects information on gasoline consumption.

In Christie's view, FEA requires no additional legislative authority to collect energy data, but its office of energy information and analysis will need considerably more resources and appropriations to augment its present $30 million budget and 350 people, he added.

While most of the nation looks ahead to the new Energy Department to begin to deal with our energy problems, Christie is concerned with "improving all our data systems" today.

For Christie, the job is to "maintain a balance between improving the collection system and the modeling effort and validating this information over the long haul with the data needs people have today" — like the impact the President's energy proposals will have on the average American family.

Miller To Chair NCC '78 in Anaheim

ANAHEIM, Calif. — Stephen W. Miller of SRI International has been named conference chairman for the 1978 National Computer Conference (NCC) to be held here next June 5-8.

Miller, who served as conference chairman of the 1975 NCC here, is manager of program development for SRI's Information Science & Engineering Division.

Under Miller's direction, NCC '78 will feature about 100 technical sessions and a separate series of professional development tutorials, according to a spokesman for the American Federation of Information Processing Societies, Inc., sponsor of the annual conference.

Vendors Ask Competition But No Cross-Subsidies

(Continued from Page 1)

But the Bell System, its telephone operating companies, the U.S. Independent Telephone Association, Telenet, MCI Telecommunications Corp., Satellite Business Systems and other communications vendors urged the FCC not to adopt "an overly restrictive view" of what constitutes "communications common carriage."

Limited by a 1956 consent decree to providing communications common carrier services, AT&T is particularly concerned that whatever the commission defines as an unregulated DP service cannot be incorporated in its communications offerings.

Accordingly, the Bell System and the other carriers prefer as narrow a definition of DP as possible.

Communications and DP are not necessarily mutually exclusive activities, AT&T and the telephone companies maintained.

Many user needs are met by the carriers providing terminal equipment; terminals are helping the carriers integrate voice, data, video, image and other modes of communication for users, AT&T said.

An FCC move to limit the processing which can be performed in terminal equipment provided by carriers would inhibit innovative developments in integrated terminal equipment offerings, the Bell System argued.

Other communications vendors supported AT&T's plea for the continued ability of carriers to provide terminal and other "customer-premise equipment" capable of information processing.

The FCC's proposal to so sharpen its definitions of "communications" and "DP" that it might do away with the "hybrid" categories of teleprocessing services established as a result of the first Inquiry met with cries of alarm from data communications firms — notably Telenet and Scientific Time Sharing Corp. and from some associations, including the Computer & Communications Industry Association (CCIA).

Where the carriers would limit the FCC's definition of DP, the data processing companies and their trade associations want it to be even broader.

IBM, the Computer and Business Equipment Manufacturers Association (Cbema), the Association of Data Processing Service Organizations (Adapso) and others strongly supported the FCC's policy to date of leaving DP to the forces of competition.

Several of these Inquiry participants urged the continuation of the doctrine of maximum separation. Cbema and CCIA argued the FCC should apply these same rules to carrier provision of customer-premise equipment and then leave the terminal equipment marketplace free from further regulation.

Many participants agreed with IBM that, overall, the FCC "should not seek to regulate compound data services or other distributed DP offerings of communications common carriers."

The commission would serve the public interest best if it would regulate "pure transmission services" at most, IBM and Cbema said.

IBM added that the FCC need not require the common carriers to establish separate subsidiaries to handle customer-premise equipment or other services involving more than transparent exchanges and private line services. The commission could establish a system of accounting regulations that would properly allocate the costs of providing regulated and unregulated services.

Carriers would have to bill separately for unregulated activities, IBM suggested. "The risk of loss and opportunities for profit would be borne by the unregulated venture, and therefore by the carrier's shareholders and not by the users of the carrier's regulated services," the corporation said.

Users Want Carriers Allowed to Offer DP

(Continued from Page 1)

AT&T and its subsidiary companies be devoted to the solution of data transmission problems, among other things," the committee said.

"It is important to communications users that the Bell System be permitted to provide unregulated DP services when, because of blurred distinctions, this becomes necessary to fulfillment of its future communications responsibilities."

The ad hoc committee recommended that legislation be enacted to make it clear that an AT&T subsidiary can lawfully offer nonregulated DP services.

Other users, like the Seattle-First National Bank and Aeronautical Radio, Inc. (Arinc), which provides telecommunications to the air transport industry, urged the continuation of the FCC's recognition of the "gray" area of "hybrid" telecommunications and DP services.

The Seattle bank echoed vendor recommendations that the FCC regulate only the switching and point-to-point communications services offered by the carriers.

"Otherwise, teleprocessing networks should be unregulated except for necessary interconnect regulations and those safeguards needed to prevent common carriers from giving their unregulated service offerings preferences or cross-subsidization," the bank said.

Critical to Data Policy

Talk of Abandoning PIN Launches Swedish Controversy

By G. Russell Pipe
Special to Computerworld

STOCKHOLM, Sweden — When Prime Minister Thorbjorn Falldin said the Swedish cabinet was considering abandoning the personal identification number (PIN) that all Swedes are assigned at birth, it seemed like just a passing remark — but that remark launched a national controversy.

The Prime Minister, who led a center party coalition takeover of the government in September after 45 years of socialist rule, explained his concern over the PIN by saying "privacy and security questions are very critical to the new government's data policy."

Press reaction was dramatic, with headlines applauding the news: "Killing PIN Can Give Us Data Safety," "One Number Too Much," "PIN is a Privacy Risk" and "A Stick in the Spokes of Big Brother's Wheel."

The socialist press, however, was cool to the idea, referring to the "desperate Prime Minister," who was leaping to conclusions without considering the cost of undoing the PIN's applications.

Since 1947, the 10-digit, unique personal identifier assigned at birth to all citizens and also issued to permanent residents, has become more important than a person's own name. With highly advanced computing techniques, the PIN has served to link all types of files in government and business.

The Central Bureau of Statistics, for example, maintains over 120 separate data bases from the full census and population registers of 8 million persons and the near universal tax and voter lists, down to sample surveys and small area data generated for particular research projects.

Growing Controversy

The controversy finds its roots in a growing privacy debate that began with the 1970 census and has been building ever since. In 1973, the Swedish Data Act was adopted, creating a Data Inspection Board with power to license all government and private personal data systems maintained on computers.

The PIN entered the political debate in 1976 after conservative parliamentarian Anders Wijkman issued a report called an "Alternative Data Policy," referring to the dangerous linking of data which it has facilitated.

The report said "PIN presaged computers and, if its original sponsors realized what is now happening, they would not have proposed it."

A main concern is the reuse of personal data without the data subject's awareness, making possible longitudinal surveys and building of central files which amass unnecessarily integrated files, according to Wijkman.

The debate was reinforced after the 1976 general election when the Swedish Gallup Institute released results of a poll on the question: "Do you think the use of the PIN ought to be: limited (44%), widened (41%) or remain the same (8%)?

When asked if they agreed with the question: "Does linking records pose a threat to privacy?" 65% of the respondents indicated yes; 20%, no; and 15%, don't know.

A third query concerned whether there is a risk of misuse of personal information if it is maintained in computer files. Here the results were: 41%, quite probably risk of misuse; 33%, some possibility; and 15%, no possibility.

The costs of changing to alternative numbering systems are frequently raised by opponents of major limitations to PIN. But few voices have proclaimed the PIN as sacred.

IBM spokesmen, for example, said the PIN is not the only way to identify individuals, many alternatives exist. They noted IBM can build controls into its computer systems so unauthorized access is effectively controlled.

Falldin recently announced postponement of a proposed new tax processing computer center "until the government can investigate privacy-security questions."

"I believe we must seriously evaluate the use of a different approach to computer systems because today it is easy to link information from different systems, so there is a threat to people which has led to frightening perspectives," he said.

"This will require different measures and one immediate measure to be considered should be abolishing PIN in computer files. The linking and identification problems can be solved in ways so it is less possible to integrate information and citizens can be more confident of the use of personal data," he added.

This somewhat surprising turn of events over the Swedish PIN may send shockwaves to its neighboring countries, Denmark and Norway, where complaints about unrestricted use of the number are growing.

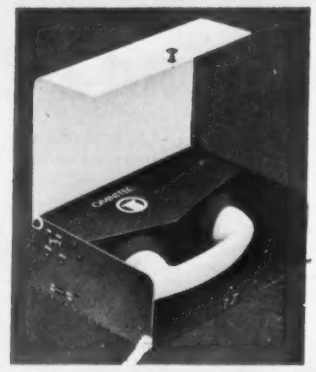
Because Sweden has been a model of PIN excellence, those taking support from it for their own proposed PINs in Holland, Germany, Austria and Belgium may be forced to reassess their position.

These developments could reinforce U.S. opponents of PIN and population registration generally.

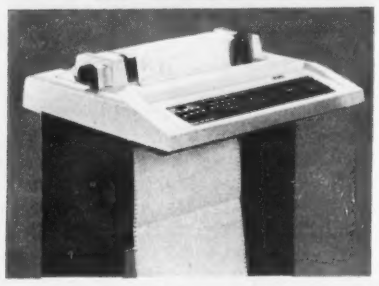
As far as implementing the proposals in Sweden are concerned, a committee of Parliament — conveniently chaired by Wijkman — is already at work on the problem.

NEW LA-180
DECprinter

NEW OMNITEC
103/202
and 1200B

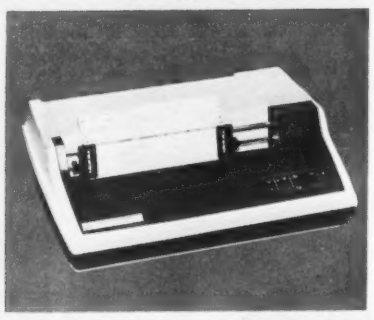


NEW LS-120
DECwriter III

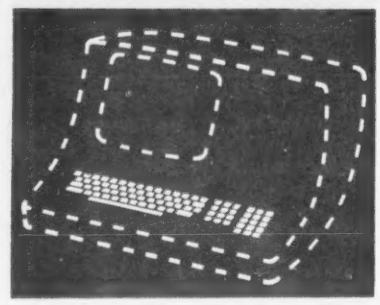


NEW
TECHTRAN 815

NEW
TI 810



NEW ADDS
REGENT CRT line



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Witness Andreini Reflects on Trial

Legal Process Needs Streamlining

By Catherine Arnst
Of the CW Staff

NEW YORK — The legal process should be able to "get to the heart of the matter faster and with less pain," Richard Andreini, vice-president of marketing for Intersil, Inc. (formerly Advanced Memory Systems [AMS]) said after spending 14 days spread out over three weeks on the witness stand in the U.S. vs. IBM antitrust trial.

"I felt it was important that what I knew be said, "I would do it all over again if I had to."

Besides the 14 days he spent in court, Andreini was deposed by attorneys twice in preparation for his testimony for a total of three days, and he spent another four to five days preparing for his appearance on the stand.

His appearance as a witness also placed a "formidable burden" on Intersil, a memory and semiconductor manufacturer, Andreini said. The cost and time spent over the past three years producing documents to be used during his testimony was "five- to 10 times what I expected," he said.

It was even harder on his family, he noted. Andreini lives in California and commuted there on weekends. He has four daughters ages 11, 12, 15 and 17. "It was not pleasant for them . . . they are not used to my being away for long stretches," he said.

Compliments Bestowed

Andreini complimented the government staff for the support he was given and for the way he was prepared to appear on the stand.

Although Judge David N. Edelstein has criticized both the government and IBM for poor deposition programs because so many witnesses have come to the stand unprepared, Andreini denied this was the case with him.

As a layman, his big concern with this now two-year-old trial is its length, Andreini indicated. "Will the issues still be meaningful" by the time a decision is handed down? he asked.

One of the basic tenets of the constitution is the right to a free trial, but civil cases are getting too drawn out, he said. "Throughout our history, the legal profession has seen fewer changes than any other [area] and the legal process needs streamlining," he added.

Andreini came down very hard on IBM during his testimony, describing it as "one of the most powerful companies in the world [that] can, at any time, put any company competing against it out of business" [CW, May 9].

However, in conversation, he added that IBM is a "fine company which trained and taught me very well." (Andreini had been an IBM salesman before joining AMS).

The two descriptions are not contradictory, he said, but the latter should not be taken into account when trying the firm.

Like many recent critics of the antitrust laws [CW, May 23], he questioned the time-consuming necessity of proving intent.

"In terms of how the marketplace reacts, intent is not important . . . how a monopoly achieved its market position is important."

Publication Contends

Russians Move to Protect Personal Data on Citizens

Special to Computerworld

MOSCOW — The government of the Soviet Union is taking steps to protect personal data about Soviet citizens stored in computers, according to "Soviet Studies," and authoritative Russian publication.

In an article written by Anatoly Vengurov, honorary professor and director of the department of legislative problems in the computerization of administration at the Institute of Scientific Research Into Soviet Legislation, the author noted that "the use of the computer to store information about citizens raises some fundamentally new questions which are not answered by existing legal norms."

The privacy issue emerged as the collection of sociodemographic data evolved from "imprecise samplings of population census data to detailed computer-driven searches of personal records in the population information system," he said.

"These problems have precise social and legal implications: it is a question of knowing which information about citizens must be stored in the system, by whom and how it will be handled, and how the citizen should be legally protected against possible disclosure of information," Vengurov stated.

In developing solutions to these problems, Russian experts, according to the article, are working on the preparation of "an information list from which social statistics would be taken. No one would be allowed to modify this list, which would call for 46 entries uniquely characterizing each citizen and would eradicate the flaws in sociocultural planning."

It was noted that in Russia there is no need to gather information on such items as personal solvency or financial status, political or religious beliefs or the state of health of citizens.

One current project, called "General Regulations on the Use of Documents Processed by Means of Electronic Data Processing," will involve such precautions as: measures to make sure that citizens have access to information, the means (including financial) and the transformation procedures to make it comprehensible, the means to verify the accuracy of the information about citizens and responsibility in case of falsification of the information. An essentially new right will be asserted in the Soviet Union: "Every citizen has a right of access to all information personally concerning him."

Vengurov described a problem which occurred when lists of electors were automated. "Under Soviet electoral laws, it is provided that only the authorized local organizations that prepare the lists have access to them. Although the lists contain only the age and address of the voter, their composition by computer has been declared illegal and stopped until an appropriate legal decision can be taken. The reason for this action is said to be that information about citizens may not be made available to workers in computer centers."

Penalties for the disclosure of personal information by persons having access to such data in a computer center or information office are to be established.

DP 'Craze' Reaches Privacy Commission

WASHINGTON, D.C. — The Privacy Protection Study Commission began operations two years ago, expecting to generate its final report using ordinary typewriters.

Perhaps some of the technology the commission has been studying has rubbed off on its staff, because when the commission's report appears this summer, it will be the product of a word processing/computer system, according to a spokesman for the privacy group.

Dollar Savings Cited

Using four Lexitron word processing systems to prepare the various pieces of its report, the commission has contracted with Informatics, Inc. to text edit the study on a mainframe owned by the firm.

The Informatics system will generate magnetic tapes complete with codes that will drive the photocomposer at the Government Printing Office.

The commission hopes to save "many thousands of dollars" by avoiding the typesetting step, the spokesman stated.

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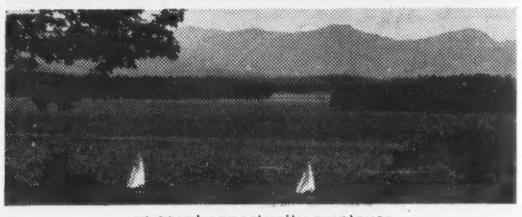

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In addition to the direct line management of your immediate staff, you will provide technical leadership and guidance to a large staff of professionals involved in this project.

We require at least 10 years large computer system experience, including a detailed knowledge of distributed processing, and experience in software development management. You should also be familiar with time sharing operating systems and macro level programming systems. It would be desirable, though not necessary to be experienced in one or more of the following: the TOPS-10 monitor, newspaper publishing systems, PDP-11 based communications network, higher level systems languages.

System Programmers

We currently have positions available in several areas for experienced System Programmers. They all require professionals with a detailed knowledge of macro level software development, familiarity with time sharing operating systems and at least 5 years experience. All positions report to the Systems Architect.

- **COMMUNICATIONS**

Involved with high speed parallel communications channel between host 1099 and PDP-11's. You'll need device driver programming experience under the TOPS-10 monitor system and a thorough knowledge of PDP-11 operations.

- **APPLICATIONS**

You'll design and implement software links between the publishing system and the commercial EDP operation. Detailed Macro-10 programming knowledge plus some COBOL knowledge is required.

- **DATA BASE**

We're looking for 2 people to be responsible for the design and implementation of a 100 megabyte editorial data base based on the HENDRIX system of individual process ques. This data base must be designed with minimum access time as the top priority goal and complete redundancy as a given requirement.

- **MONITOR/UTILITIES**

There are two positions open in this area. You'll be involved in the maintenance of the TOPS-10 monitor system and the development of additional utilities to aid the entire programming staff. These utilities include cross assemblers for the PDP-11 as well as microprocessors and on-line scrolling editors for the DECsystem-10.

- **SYSTEM INTEGRITY**

This position is responsible for the analysis of the entire system plus the development of guidelines and operating procedures to insure 100% data base integrity in case of any two-processor failure. You'll also develop system test and acceptance programs for the final testing of systems integrity.

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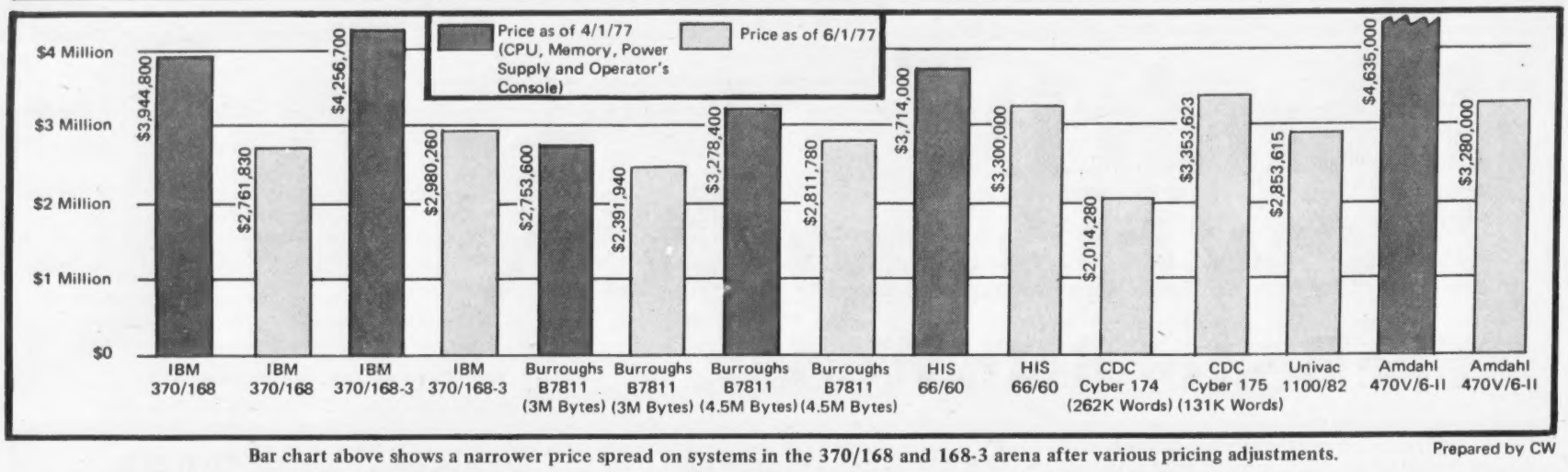


Bar chart above shows a narrower price spread on systems in the 370/168 and 168-3 arena after various pricing adjustments. Prepared by CW

Manufacturer	IBM				Burroughs				HIS		Univac**	CDC		Amdahl	
Model	370/168		370/168-3*		B7811 (3M Bytes)		B7811 (4.5M Bytes)		66/60		1100/82	Cyber 174 (262K 60-Bit Words)	Cyber 175 (131K 60-Bit Words)	470V/6-II	
	Old	New	Old	New	Old	New	Old	New	Old	New				Old	New
CPU + 4M Bytes Purchase	$3,944,800	$2,761,830	$4,256,750	$2,980,260	$2,753,600	$2,391,940	$3,278,400	$2,811,780	$3,714,000	$3,300,000	$2,853,615	$2,014,280	$3,353,623	$4,635,000	$3,280,000
Term Lease/Mo (Includes Maintenance) Years	$80,620 4	$74,695 4	$89,125 4	$83,200 4	$59,500 1	$48,563 1	$71,500 1	$56,915 1	$72,998 5	$69,777 5	$55,055 5	$46,224 3	$74,804 3		
Maintenance/Mo	$6,436.50	$6,246.50	$6,547.50	$6,357.50					$4,806	$4,806	$4,530	$5,799	$7,568	$8,600	$8,600
Purchase/Lease Ratio (Includes Maintenance)	49	37	48	36	46	49	46	49	51	47	52	44	45		

*Includes 2860 Selector Channel **Includes 200M-Byte Disk Controller and Four I/O Channels. Prepared by CW

Prices of systems said to compete with 4M-byte IBM 370/168 and 168-3 are shown above.

Users Gain More Options

(Continued from Page 1)

NCR announced a larger machine for its line, the V-8590, which is slated to fall in the range of the 370/158-3, but no detailed pricing information will be available until its introduction, a spokesman for that company said.

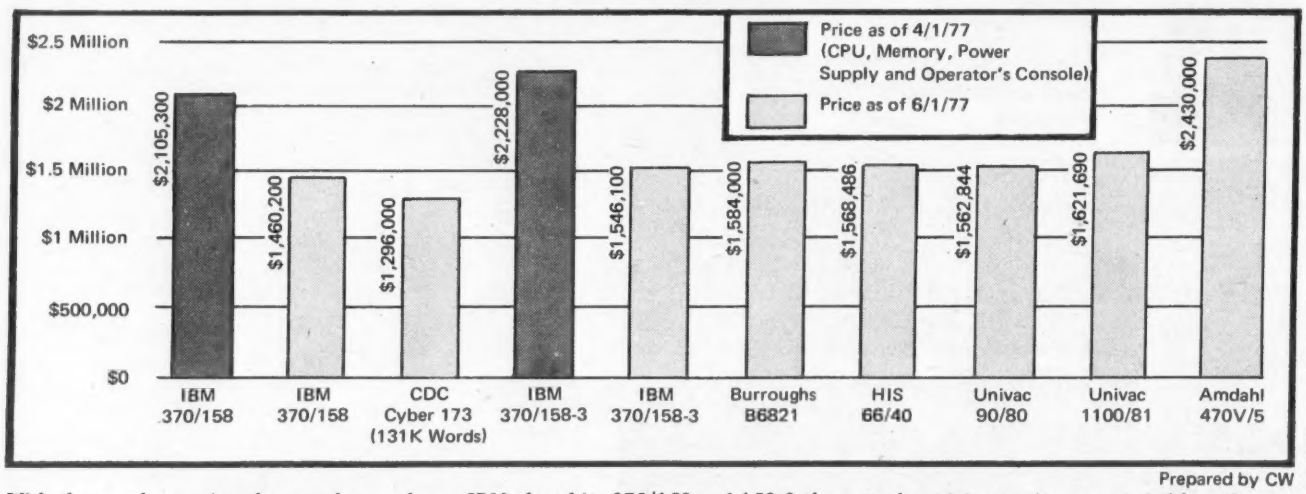
Most of the other prices remained unchanged and were for the most part well below those of the original tickets on the comparable IBM systems whose prices were cut.

CW surveyed makers and received quotes for CPU, memory, power supply and operator's console. Makers surveyed cited systems they considered competitive with a 1M-byte 370/148, 2M-byte 158 and 158-3 and 4M-byte 168 and 168-3.

CW recognizes price is not the sole criterion, but it does give some idea of the recent actions or lack thereof in the 148 to 168-3 range.

Burroughs maintained its machines are more efficient in memory management and users do not need as much memory as they would with the counterpart IBM machine.

CDC's models do not have an equivalent amount of memory in bytes, but represent the range of memory provided by CDC on these machines and are what CDC would bid against the specified IBM configurations.



Prepared by CW

With the purchase price changes shown above, IBM placed its 370/158 and 158-3 closer to the pricing territory occupied by others (Itel declined to quote AS/5 prices).

Before the latest round of announcements, IBM had the highest priced systems in the 158 and 168 ranges with the exception of Amdahl, which considers its machines more powerful and cost-effective. The 470V/6-II, for example, includes 16 channels and a high-speed multiplexer as well as other features, the firm said.

The Amdahl V/6-II was originally the highest priced model in the action-packed 168-3 field, but it is now sitting in the middle of the pack, below the prices of CDC's Cyber 175 and HIS' 66/85.

The IBM price includes one 2860 selector channel. Several other vendors pointed out the prices they quoted include necessary features such as more channels and a memory extender to handle the 4M bytes of memory, which were not quoted by IBM.

Rankings by Price

Ranked in order of price, the lowest is CDC's dual Cyber 174 with 262K 60-bit words priced at $2 million.

Burroughs follows with a price of $2.8 million for a 4.5M-byte B7811 with 28 channels.

Then comes Univac's 1100/82, which includes 200M bytes of disk, a controller and four I/O channels, with a price tag of $2.85 million.

Next is the IBM 168-3 at $2.98 million, reduced from $4.27 million. Last is the Amdahl 470 V/6-II, now priced at $3.28 million compared with the former $4.635 million.

Only CDC and Univac quoted against the

Manufacturer	IBM				Burroughs	HIS	CDC	Univac		Amdahl
Model	370/158		370/158-3		B6821 (2.4M Bytes)	66/40	Cyber 173 (131K 60-Bit Words)	90/80*	1100/81**	470V/5
	Old	New	Old	New						
CPU + 2M Bytes Purchase	$2,105,300	$1,460,200	$2,228,000	$1,546,100	$1,584,000	$1,568,486	$1,296,040	$1,562,844	$1,621,690	$2,430,000
Term Lease/Mo (Includes Maintenance) Years	$42,715 4	$39,850 4	$46,495 4	$43,630 4	$37,000 1	$39,944 6	$29,829 3	$33,354 5	$31,295 5	
Maintenance/Mo	$2,540	$2,525	$2,585	$2,570		$2,892	$3,864	$4,579	$2,575	$7,650
Purchase/Lease Ratio (Includes Maintenance)	49	37	48	35	43	39	43	47	52	

* Includes four Block Multiplexer Channels ** Includes 200M-Byte Disk, Controller and Four I/O Channels Prepared by CW

Prices of Systems Competing With the 370/158 are detailed above.

158 and 168. The other mainframers said they feel these systems are no longer being actively marketed by IBM.

CDC offers both its Cyber 175 and dual-processor Cyber 174 against both the 168 and 168-3. The Cyber 175 with 131K words costs $3.35 million and includes 10 peripheral processor units, 12 data channels and two data converter channels, the firm said.

HIS' dual 66/60 costs $3.3 million, down from the previous price of $3.7 million.

IBM dropped prices on its 168 from $3.9 million to $2.76 million.

The 158 Arena

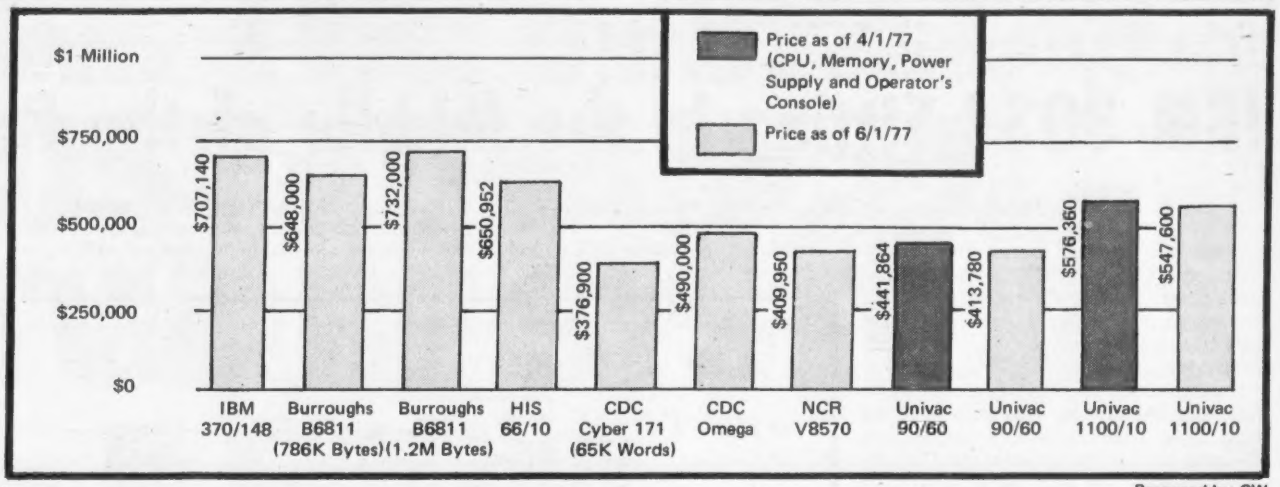
In the 158 field, IBM's machines joined offerings from Burroughs, HIS, Univac and CDC in the range from $1.2 million to the crowded area from $1.5 million to $1.6 million.

IBM slashed the price of its 2M-byte 158 from $2.1 million to $1.46 million and cut the price of its 158-3 from $2.2 million to $1.546 million, edging just under some of the other machines.

CDC and Univac each offered one system, the Cyber 173 and 1100/81, respectively, as competitors against both the 158 and 158-3.

CDC's Cyber 173 with 131K of 60-bit words slipped in at a cool $1.296 million. The 1100/81 comes packaged with a 200M-byte disk, controller and four I/O channels for $1.62 million.

Univac also offered a 90/80 against the 158-3. The 90/80 includes four block multiplexers and costs $1.56 million, which is under the $1.577 million Univac cited on the comparable IBM machine.



Prepared by CW

Prices of systems competing with a 1M-byte IBM 370/148 show little change, except for Univac. Itel declined to quote a price on its AS/4.

Although Univac had changed prices on the 90/60 against the 148, whose CPU and 1M-byte price did not change, it did not see the necessity to lower the 90/80 price, according to Curt Koster, program manager for virtual systems.

The dual-processor Burroughs B6821 with 2.4M bytes and 40 I/O channels costs $1.584 million while the HIS 66/40 is priced at $1.568 million. HIS claims the 66/40 is equal to or better than the 158-3 with mixed jobs.

In the upper end, in price and reportedly in performance, is one of Amdahl's new offerings, the 470V/5 with eight channels, priced at $2.43 million.

In the relatively staid 148 arena, the 148's price tag of $707,140 was exceeded only by that of a 1.2M-byte Burroughs B6811, which costs $732,000. However, Burroughs also offered a 786K-byte B6811 priced at $648,000.

HIS' 66/10, including a systems console with printer, is priced at $650,952. NCR's V8570, which is more appropriate as an upper end competitor with the 138, costs $409,950, a spokesman said. A 2M-byte V8570 costs $700,650.

CDC again slipped in with less memory and a lower price. Its recently introduced Cyber 171 with 65K words costs $376,900 and its newest mainframe, the Omega 480-II plug-compatible CPU, costs $490,000.

Univac cut the price of its 90/60 from $441,864 to $413,780. The 1100/10 price dropped from $576,360 to $547,600, which includes a 200M-byte disk, controller and four I/O channels.

Manufacturer	IBM	Burroughs		HIS	CDC		NCR	Univac			
Model	370/148	B6811		66/10	Cyber 171 (65K 60-Bit Words)	Omega	V8570	90/60		1100/10	
		(786K Bytes)	(1.2M Bytes)					Old	New	Old	New
CPU + 1M Byte Purchase	$707,140	$648,000	$732,000	$650,952	$376,900	$490,000	$409,950	$441,864	$413,780	$576,360	$457,600
Term Lease/Mo (Includes Maintenance) Years	$17,624 4	$15,500 1	$18,300 1	$13,698 6	$6,679 3		$9,810 5	$12,171 5	$11,497 5	$12,626 5	$12,421 5
Maintenance/Mo	$2,267			$1,896	$1,389		$1,357	$1,739	$1,739	$3,221	$3,221
Purchase/Lease Ratio (Includes Maintenance)	40	42	40	48	56		42	36	36	46	44

Prepared by CW

Prices of systems in the 370/148 range are shown above.

Price Spread of $1 Million

IBM 3033 Sitting in the Middle of the Pricing Scale

By Molly Upton
Of the CW Staff

When the dust had settled after the announcement of the IBM 3033 and the Amdahl Corp. 470V/7, the results showed a situation similar to that in the 370 range: The latest IBM machine sits in the middle of the pricing scale.

The overall price spread was about $1 million from the low entry by Univac to the high entry from Honeywell Information Systems, Inc., if one excludes the 370/168-3, whose price was $2.5 million more than the HIS entry and $1 million more than the 3033.

Although benchmarks of the 3033 are either nonexistent or very scarce, other vendors offered machines they said they expect to bid against the 3033, which is stated to be 1.6 to 1.8 times faster than the 168-3.

Clearly, IBM has again made its price/-performance ratio much more attractive, with the 3033 priced under some of the other systems.

168-3 More Costly

The 168-3, even after its recent CPU and memory price cuts, costs more than Amdahl's 470V/7, which is supposed to be 1.5 to 1.7 times faster than the firm's V/6.

The price of the 168-3 comparably configured to the 3033, with 12 channels and an extended feature for MVS system extension products, is $4.3 million compared with $3.38 million for the 3033.

Univac came in with a low price of $2.85 million for its 1100/82, which it also offered against the 168-3. A spokesman indicated more powerful machines will be coming from his company.

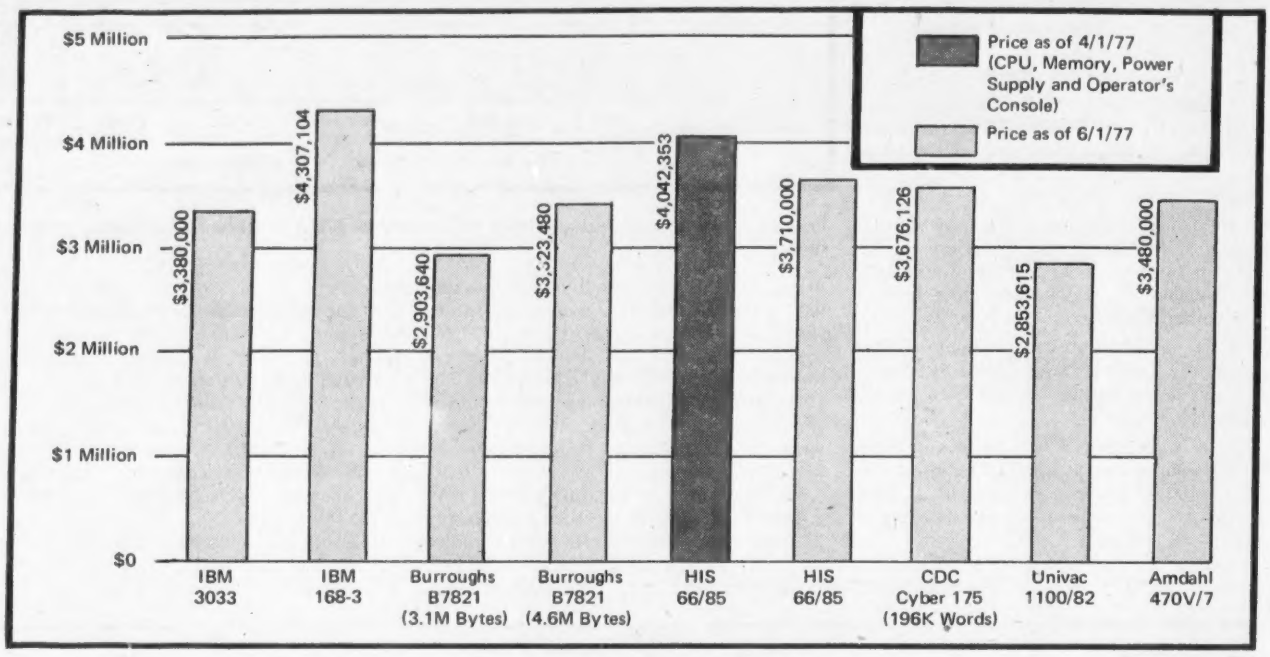
Burroughs followed with a $3.3 million tag on its dual B7821 with 4.6M bytes. The system includes two I/O processors and a total of 56 channels, along with a maintenance diagnostic unit and dual displays on the operator console, a spokesman said.

The lease price for the B7821 includes 24-hour maintenance. Other Burroughs systems are quoted with one-shift maintenance.

Amdahl Next

After the IBM 3033 priced at $3.38 million comes the Amdahl 470V/7 with a price of $3.48 million, followed by Control Data Corp.'s Cyber 175 with 196K 60-bit words for $3.68 million. The Cyber 175 includes nels and two data converter channels, a spokesman said.

HIS bid its 66/85 for $3.7 million, which includes a system console with dual CRTs and one printer, the equivalent to three selector and two high-speed channel groups and two low-speed channel groups and a control store extension to handle 4M bytes, a spokesman said.



Purchase prices of systems in the 3033 range are shown above. Prepared by CW

Manufacturer	IBM		Burroughs		CDC	HIS	Univac	Amdahl
Model	IBM 3033	168-3 (Comparably Configured)	B7821 (3.1M Bytes)	B7821 (4.6M Bytes)	Cyber 175 (196K 60-Bit Words)	66/85	1100/82	470V/7
CPU + 4M Bytes Purchase	$3,380,000	$4,307,104	$2,903,640	$3,323,480	$3,676,126	$3,710,000	$2,853,615	$3,480,000
Term Lease/Mo (Includes Maintenance Years)	$70,400 4	$118,114 4	$67,720 1	$77,320 1	$82,066 3	$77,305 6	$55,055 5	
Maintenance/Mo	$8,000	$9,252			$8,200	$8,061	$4,530	$8,600
Purchase/Lease Ratio (Includes Maintenance)	48	36.5	42.8	42.9	45	48	52	

Prices of Systems in the 3033 Range Prepared by CW

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CAI Helping Pupils Move Four Grades in Three Years

By Robert L. Glass
Special to Computerworld

SEATTLE — Computer-aided instruction (CAI) is being used in the Highline School District here to take academically below-level students at the junior high school level and advance them to one year above their grade level in just three years.

And the kids love it. "There is no such thing as 'before school' or 'after school,' " according to Jay Davis, the educator in charge of the project.

"We just can't get the kids out of the terminal room. Can you imagine a 10-year old skipping recess so he can do a reading lesson?"

The project, partly supported by federal Title I funding, has enrolled about 900 of the 30,000 students in the district.

The cost per student is about $100/year. The Washington State Department of Education feels that a school district is doing well if it spends $300 to $400 per student on a supplementary educational program. Thus the system is proving remarkably cost-effective, Davis indicated.

Highline's program utilizes a Hewlett-Packard 2000F minicomputer with 30 terminals. The computer is housed at Cascade Junior High, where 10 terminals are wired directly to the system.

Eighteen terminals are connected by phone lines to the computer from remote sites, which include one other junior high school, seven elementary schools and one private school.

Davis is convinced CAI is one of the most viable areas in education. With 30 terminals, Highline's is the largest CAI operation in the state.

Mathematica Grant Honors Founder

PRINCETON, N.J. — To celebrate the 75th birthday of Prof. Oskar Morgenstern, founder and chairman of the board of Mathematica, Inc., here and to pay tribute to his contributions to economic analysis and the decision sciences, Mathematica's board of directors has established the Oskar Morgenstern Distinguished Fellowship.

Applications and recommendations are invited for the academic year 1977-78 and beyond, according to President Tibor Fabian.

The purpose of the fellowship is to enable "a member of the academic or research staff of a university, an official of the U.S. government or a researcher elsewhere" to spend a sabbatical leave at Mathematica, he said.

While here, the Morgenstern Fellow would be free to continue personal research activities and to participate in and review technical and scientific activities being conducted by the company's staff. The Fellow would be expected to present two lectures to the staff and its guests, Fabian added.

Applicants are expected to have achieved "significant accomplishments" in "at least one" of several specific areas. These include programming languages, information management, operations research methods and applications, as well as economic theory, economic and social policy analysis, survey research methodology, arms control and analysis and national defense policy, according to Fabian.

The Mathematica fellowship marks the third time Morgenstern's work — with John von Neumann and others — has been recognized through the establishment of a research grant. Earlier this year, the Hebrew University in Jerusalem announced the Morgenstern-von Neumann Research Fund for Mathematical Economics and Game Theory and named Morgenstern an honorary fellow.

New York University, where the professor has taught since 1970 (after retiring from Princeton), has also announced the establishment of an Oskar Morgenstern Research Professorship.

Requests for more information about Mathematica's fellowship and suggestions for potential recipients should be addressed to Fabian's office through P.O. Box 2392, Princeton, N.J. 08540.

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Computerworld

Computer Reminders Improve Care

Study Suggests Mental Saturation Causes MD Oversights

By Nancy French
Of the CW Staff

INDIANAPOLIS, Indiana — When physicians' memories are joggled by a computer, their patients receive better care, according to a recently completed research project at the Wishard Memorial Hospital here.

According to Dr. Clement J. McDonald, who conducted the study, the results proved that doctors are like any other human beings — when they are very busy they become mentally saturated, he wrote in the *New England Journal of Medicine*. So when keeping watch for random and infrequent "pathological events" during the course of diagnosis and treatment, the physician periodically overlooks some.

McDonald contended that many medical errors are due to the physician's "intrinsic limits rather than to remedial flaws in his fund of knowledge" or selfish motives. And this is where the computer comes in.

McDonald's research project compared physicians' treatment actions with the "recommended actions" taken from respected medical journals. The actions were expressed in 390 English-like statements of clinical events and the course of action needed to "correct" those events, according to the *Journal* article.

Most events concerned conditions managed by drugs, but some involved the work-up of various abnormalities discovered through laboratory tests.

For each patient's clinic visit used as part of the study, the hospital's medical record system produced three different reports. The first was a surveillance report, which contained all the computer recommendations for a given patient.

The second was a computer-tailored encounter form on which the computer displayed the patient's active prescriptions as written at the last visit. The encounter form also provided space for physicians to record clinical findings. All orders were written on the encounter form, a portion of which became the prescription sent to the pharmacy.

The third report, a summary, was the only one that was not influenced by the computer instructions. It was a summary of the patient's clinical course that included his symptoms, clinical findings, diagnostic studies and medical history.

To assure that the recommendations were actually read by the doctors, each was asked to notate each recommendation to indicate whether he agreed, disagreed or whether the recommendation was a consequence of missing data.

Each of the nine physicians participating in the study served as his own control. Four physicians served as study subjects first and controls second, the other five reversed these roles. A study subject received computer recommendations, while a control subject only received the encounter form and the summary.

The study was carried out during a 17-week period during which the computer detected 712 events needing attention in 256 patient visits by 189 different patients.

Overall, the physicians reacted to 51% of 327 events when given computer instructions and 22% of 385 events when not given any recommendations. Each of the nine physicians responded to a greater percentage of events when given computer recommendations than when not.

Overall, the level of training — intern, first-year resident or second-year resident — had no significant effect on the results.

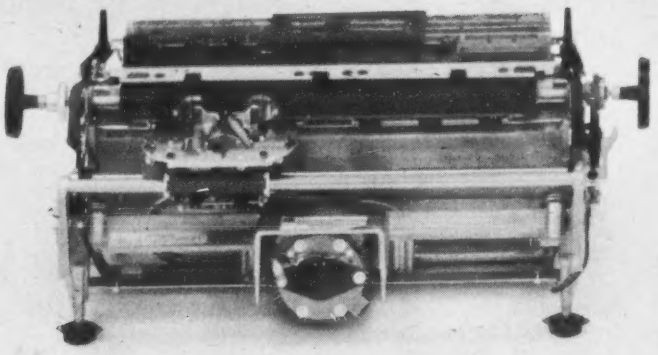
Physicians detected and responded to twice as many events when given computer recommendations as when not.

This tends to prove, according to McDonald, that "to the extent that the study protocols defined good medical process, the computer suggestions improved care." In addition, they revealed a persistent "deficit" in the conventional care process as typified by the control encounters, McDonald said.

It tends to disprove that medical ignorance is the cause of errors in medical practice, because if ignorance had been a substantial factor, the base-line response rate should have been higher for physicians with more years of training. It also should have been higher for those control periods following their study periods because of the "training effect" of the antecedent study period and neither of these occurred, he said.

"The amount of data presented to the physician per unit time is more than he can process without error," McDonald said. The computer augments the physician's capabilities, thereby reducing his error rate, the study showed.

McDonald concluded that although the individual physician "is not perfectible," the system of care is, and here the computer can play a major role.



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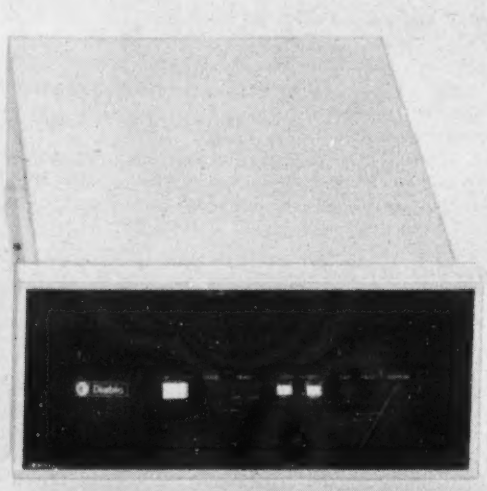

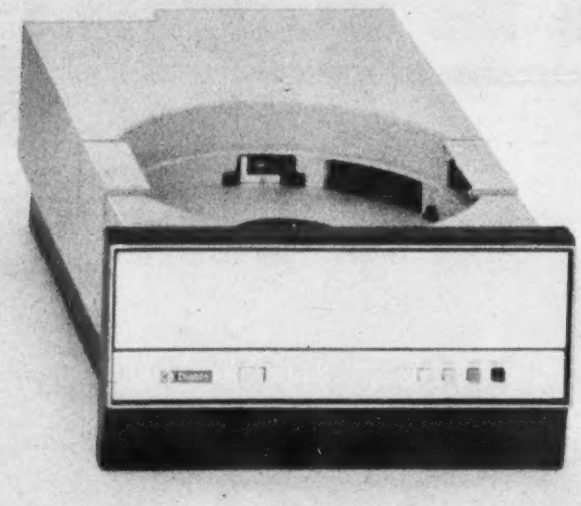

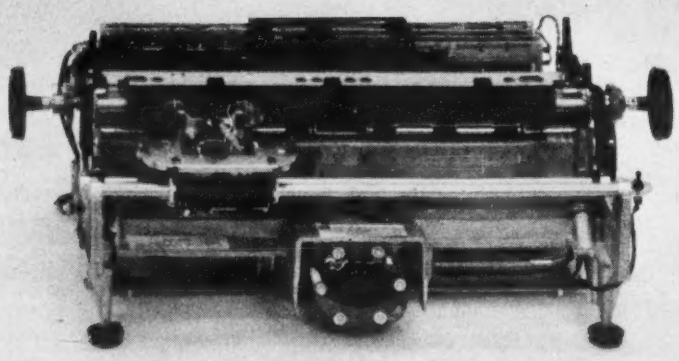

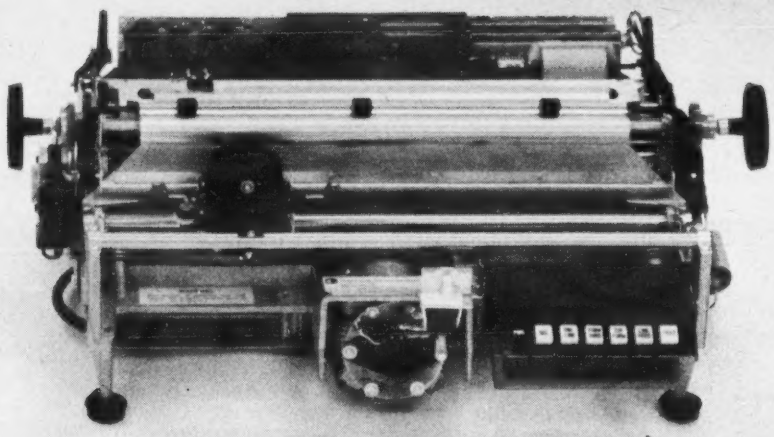

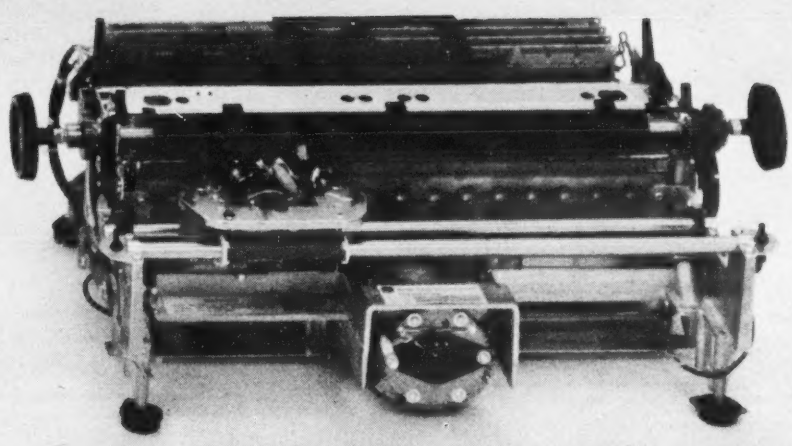

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A Modern-Day Seurat

Artist Uses Line Printer

By Nancy French
Of the CW Staff

COLUMBIA, Missouri — Artist Richard Helmick, a modern-day pointillist, uses computer output as a launching pad for creating screenprints that resemble a mechanical version of the impressionism popularized by French artist Georges Seurat in the late 1800s.

Like Seurat, Helmick creates his works by applying small spots of color to a surface. From a distance, the spots blend together, creating the impression of a scene taken from everyday life.

Unlike Seurat, however, Helmick renders his limited-edition screen prints with the use of one or more patterns generated by a computer-driven line printer.

Helmick usually starts with a photograph that is optically scanned with a Spatial Data Systems Model 108 Computer Eye Scanner. The scanner, which is driven by a Digital Equipment Corp. PDP-11/50 records the relative light and dark areas of the entire surface. That data is stored on magnetic tape, the artist said.

A simulation of the photograph is then generated on an IBM 1403 high-speed line printer driven by an IBM 370/168 at the University of Missouri computer center here.

Light and Dark Value

A program called Picprint, written by research assistant Pat Caudill, is used to measure the relative light and dark value of every single coordinate on the photo and to print out those values in predetermined alphanumeric characters that best express the light and dark values, Helmick said.

New Masters

The next step is to photograph the output as black-and-white line art (no grays are recorded). Once the negative is processed, Helmick is ready to make his screen or stencil — a step that is also performed photographically.

Helmick makes his stencils on commercial polyester multifilament fabric stretched on wood frames. This he does by squeegee-

to Produce Programmed Pointillism

ing a light-sensitive photographic emulsion over the entire screen.

The negative or positive — whichever appeals to the artist — is then exposed onto the fabric in the same way a negative is exposed on paper to make a photograph. The fabric is "developed" by washing the chemicals off the screen, leaving open pores through which paints can be forced to create an image on paper.

Color Applications

Helmick then selectively blocks out any areas of the stencil he does not wish to print, for various reasons, by covering them with water-soluble mucilage glue.

Then, one color at a time, he forces paints through the open pores of the screen onto paper. He uses printer's "process" colors — which are basically only four colors, magenta, yellow, cyan and black — but creates his own colors by mixing them together first.

After each color application, the artist washes the screen and blocks out a different portion to paint different areas of the print.

The screenprint process enables Helmick to "combine and manipulate" the computer-generated patterns in a way that makes "aesthetic sense," he explained.

Helmick uses a computer as a tool in creating his works because it is the "best means of achieving random, arbitrary or, at least, unforeseen graphic results," he said.

Output "Coarse"

Helmick pointed out that most "computer artists" don't like computer output as a basis for art because "it's so coarse; but it's just that coarseness that I like," he said.

The coarse mechanical patterns output on a line printer "can unify and activate graphic compositions simultaneously," he said.

"If line printer patterns are continuous throughout the image area and do not end at color-shape boundaries, the patterns tend to knit the composition together. On the other hand, if the patterns are visually uneventful, they also add a visual pulse to the work."

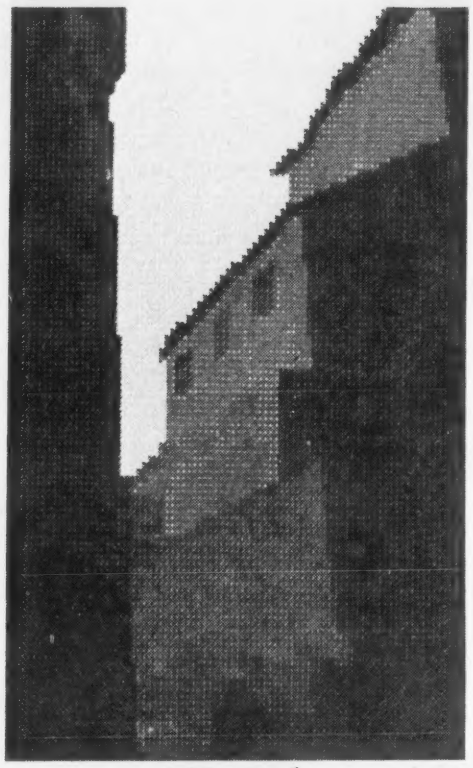
Helmick was introduced to the artistic possibilities of computers five years ago when he was interested in "stereoscopic" — or 3-D — paintings of abstract designs.

"To create a 3-D illusion — the artist must have one image or design with two slightly different points of view." When someone looks at such a picture, "one design is routed to one eye, the other is routed to the other eye and the brain synthesizes the two images into one creating the illusion of depth," he explained.

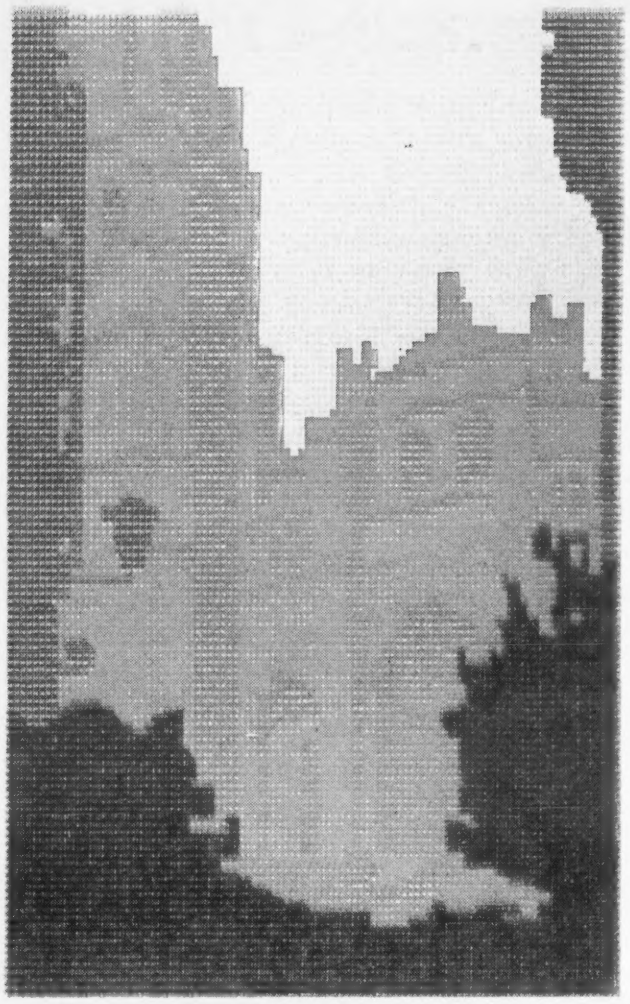
"I was having a hard time trying to do abstract designs from two perspectives, and, at the time, someone told me computers could give me the appropriate pair of designs," he said.

"When I looked into this, I got involved with computers for their own aesthetic merits and lost interest in 3-D," he added.

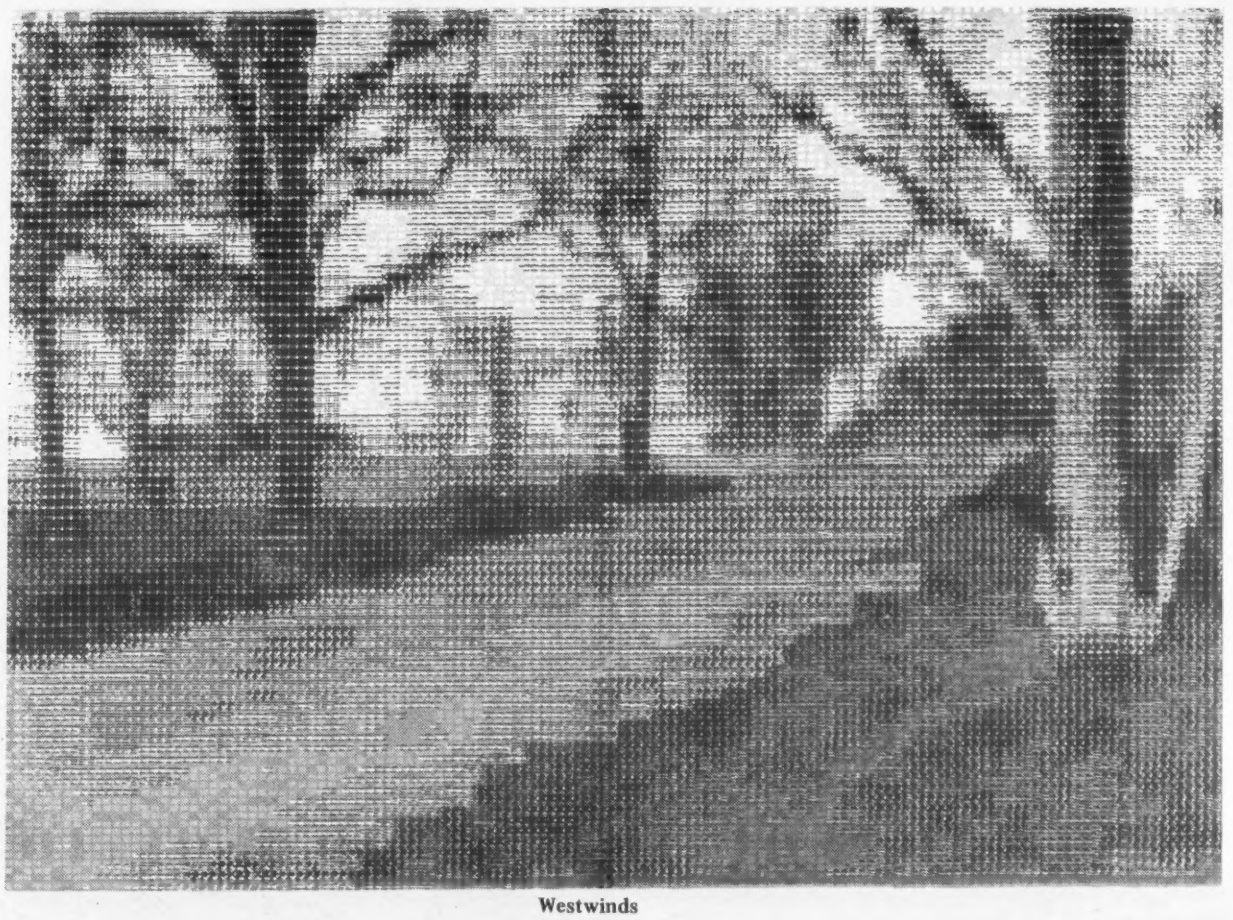
Helmick, who is an associate professor of housing and interior design at the University of Missouri, has been doing these prints ever since.



Santo Tomé



View of Toledo



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CPU Heat Harnessed; Utility Saves Face

By E. Drake Lundell Jr.
Of the CW Staff

PHILADELPHIA — Computers are doing double duty in reducing the energy consumption at Philadelphia Electric Co.'s downtown skyscraper here.

The organization's two Honeywell Information Systems Model 8200 computers are being used as a heat source for the building, while a microprocessor-based energy management system monitors the energy use in the entire plant.

Philadelphia Electric had two reasons to turn to its computers for energy reduction. First, the organization wanted to save money and secondly, the firm's skyscraper was giving it a bad public image after the oil crisis of 1973.

The bad image resulted because the firm had originally decided to heat the building entirely by lights when the 850,000 square foot skyscraper was built. Therefore, it has no boilers and all of the lights were kept on constantly to provide heat for the structure.

In fact, this method of heating did save on energy, but after the oil embargo of October 1973 a nationwide effort was started to reduce lighting use and the building stood out like a sore thumb with its lights burning around the clock.

Computers and Energy

No public relations effort about the efficiency of heat-by-light systems could quiet the anger of people viewing the building from their 68-degree homes, Alexander L. Parry Jr., manager for service operations for the building, remembered.

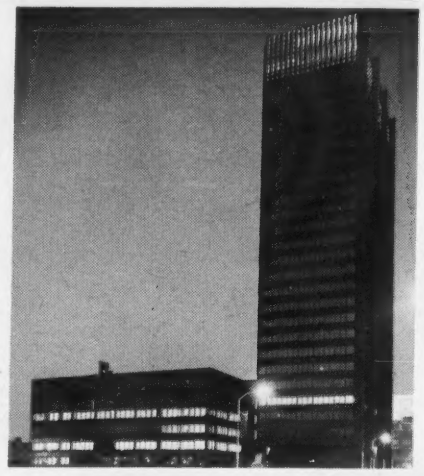
But without boilers the utility had to find another source for its heat, and that's when it turned to using the heat generated by its computer systems, Parry said.

At the same time, the building was anxious to reduce its heating bill for purely monetary reasons: electric consumption had reached 50 million kW hours early in 1973 and was exceeding the utility's budget.

First Philadelphia Electric installed monitoring equipment to pinpoint high use areas, which led to a reduction in the overall lighting levels of the building. The company also began an employee training program to make employees more aware of the need to conserve energy.

After several experiments, Parry's staff found they could heat the building — even in temperatures as low as 44 degrees F with the waste heat generated by the two computer systems.

Heat given off by these systems is captured by cool water, which is thereby heated and in turn heats air circulated through the building's perimeter distribution system. With this heating procedure, the building can be darkened, cutting down public disapproval. Furthermore, all of the energy used for heat now would have previously been dissipated into the atmosphere through cooling towers.



Building had "a bad image."

The conservation effort and the use of the computers for heat brought the power consumption down to 36 million kW hours by the end of 1975 — a 28% reduction from the 1973 level.

During this time the firm had also depended on a manual shutdown of fans in the skyscraper for some of the savings and it was up to operators to judge whether the shutdowns would cause the building to be too cool in the morning.

To manage the utility's heating system it installed a Delta 1000 microprocessor-based heating and air conditioning control system.

"Most important among our considerations before updating, was a desire to establish an effective startup and shutdown schedule to optimize energy utilization," Parry noted, adding "we also needed improved equipment monitoring capability."

The new system was installed last September and between mid-September and mid-October the energy consumption was the lowest in the utility's history, falling 656,000 kW hours to 2.36 million kW hours from the comparable period a year earlier. The firm has set a goal of 30 million kW hours per year with the new equipment and Parry believes it can get energy consumption down to 28 million kW hours.

"I feel we can save about 2 million kW hours just by computerization of equipment shutdown, rather than a manual operation," he added. "This alone would mean a one-year return on our investment."

IBM Plans Buildings That Conserve Energy

By John P. Hebert
Of the CW Staff

ATLANTA — All of IBM's office buildings are now planned with energy conservation in mind and rely on computer simulation and mathematical modeling for their design, according to a spokesman.

While there is a limit to improving the energy efficiency in existing buildings, IBM's objective is to reduce energy use in new office buildings by 30% to 40% from 1970 designs, the spokesman indicated.

A new 11-story building here employing some of the most recent energy-saving techniques is expected to save IBM $160,000 annually, the spokesman noted.

An architect built the structure with conservation in mind, he said, adding an IBM 7 was installed when the building was being constructed.

About 40% of the structure is glass; and cedar sun shades limit the sunlight entering its rooms.

Like its Chicago counterpart, the computer system receives constant input from a rooftop weather station to help control the interior environment, the spokesman noted.

The only time the electric boiler need be used, he added, is when the outside temperature drops below 11 degrees, which is rare in Atlanta.

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Extra! Newspaper Saves $100,000 in Electric Bills

By John P. Hebert
Of the CW Staff

BOSTON — The Globe Newspaper Co., publisher of *The Boston Globe*, operates a computerized power management system that has saved its owners more than $100,000 in electrical power costs during the first 16 months of operation.

The system also keeps an eye on building fire protection and 56 security doors in the *Globe's* main production plant here. It also counts the newspapers printed by the firm's 64 presses, according to Joseph Stanley, plant engineer.

Before the energy crisis, the newspaper's electric bills ran about $34,000/mo, Stanley recalled.

Computers and Energy

After the full effects of the Arab oil boycott hit Boston Edison Co. consumers' monthly bills, the *Globe's* bills jumped to $75,000. The cost-of-fuel adjustment charge alone, which comprised about 40% to 45% of the bill, reached almost $35,000.

"It was then we decided to install the computerized power management system," a Digital Equipment Corp. PDP-11/45 minicomputer, Stanley said.

In addition to a 56K processor, the system includes a DEC RK05 cartridge disk, a DEC magnetic tape drive, a DEC TU-60 dual cassette magnetic tape drive and an industrial control subsystem for sending and receiving the electrical signals.

The system's operating software is DEC's RSX-11M real-time monitor.

Peripherals to the power management/security and production monitoring system include two DEC-supplied CRTs and two printers, one of which provides Stanley and his staff with power consumption data for each of the 44 electrical devices monitored.

To regulate power demand and consumption for air conditioning at the newspaper plant, the computer system controls 42 30 horsepower fan units and two 300 horsepower water chillers, according to the plant engineer. By tracking priority levels assigned to each unit, it is able to shed less essential loads as overall power demand increases, especially at times of peak press activity.

But at no time can the system shut down all of the air conditioning equipment, Stanley said. "One chiller has to be on at all times or everybody would be screaming at me."

Predicts Demand

The system operator sets a target power demand level for each 30-minute demand interval. Continuously monitoring power usage, the system predicts a demand level for the end of each interval.

If this forecast level exceeds the target level, the system begins shedding loads by shutting down nonessential equipment for specified periods.

Saturday is the peak demand period, since the *Globe's* 64 letter presses, the largest noncontrollable load in the plant, are most active then, printing the bulky, high-circulation Sunday paper.

Because weekday demand levels are much lower than Saturday's, setting a target demand to deal with the Saturday peak would waste the system's control capability during the rest of the week, according to Stanley.

The solution was to maximize savings by setting a target demand designed to cut consumption under usual weekday circumstances. An unavoidable consequence is that Saturday's demand activates system alarms even after all available loads have been shed. Operators ignore the stream of alarm messages, however, realizing that demand and usage have been reduced to the practical minimum.

On Sunday, a slack day for office and press activity, the problem is the opposite; the weekday target demand level is too high. To bring about further savings, Stanley is developing a second tape cassette containing different load parameters and a lower target level for Sunday use.

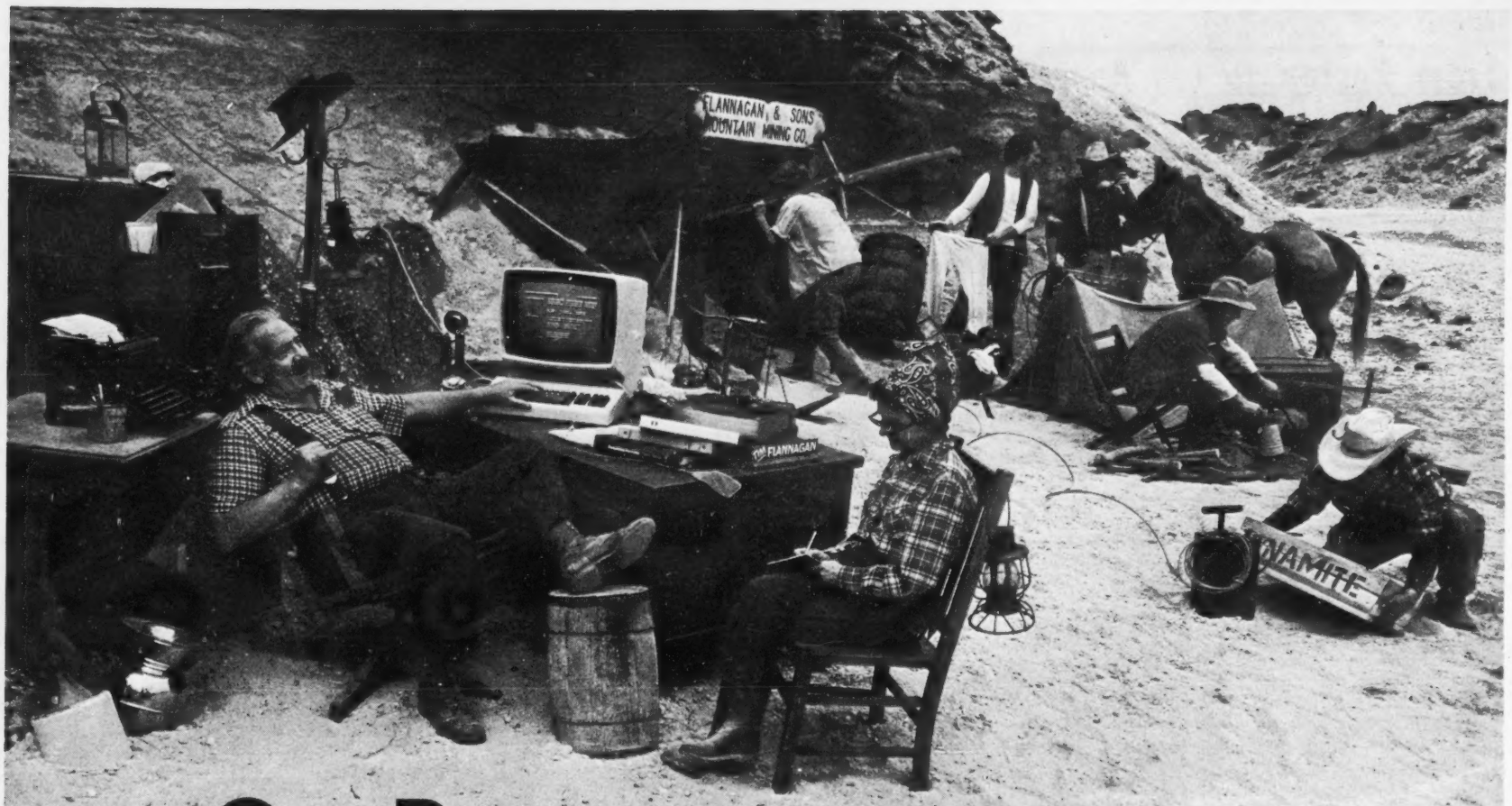
The newspaper's monthly electric bills are in the neighborhood of $56,000, which Stanley said is a $6,000 to $8,000 savings each month.

Before the system was installed, the plant's electrical consumption was about 3,400 kWhours/mo. Now, Stanley added, when consumption exceeds 1,400 kW hours in a monthly billing period, he starts shutting down the air conditioning equipment.

Winter electrical consumption hovers between 2,200 and 2,400 kWhours/mo and during the summer months, it is stabilized at about 2,600 kWhours/mo, he said.

The system's value in controlling electrical power consumption was demonstrated last July when the system was shut down for a week of plant rewiring.

"Our electric bill was up 30% — to $84,000 — for that month because demand was skyrocketing, Stanley recalled. "That told us where we would have been without power management. Believe me, we're much happier where we are," he concluded.



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From Boston to Los Angeles

Remote 'Boss' Slashing Users' Utility Costs

A remote computer-based energy management system is saving users from Boston to Los Angeles thousands of dollars yearly by reducing their bills for heating and air conditioning.

The Building Operation Services System (Boss) is available from Honeywell's Commercial Division and is based on a specially designed computer system for energy management called the Delta 2000.

In Oklahoma City, Okla., the Fidelity National Building Corp. saved the cost of installing the system in just five months and annual savings are running over $100,000.

The 16-floor building uses the remote service to start and stop its heating, cooling and ventilating systems based on the occupancy of the building. This process has allowed it to cut back from energy consumption of around 1.2 million kW hours in July 1976 to around 934,800 kW hours a year later.

At the Boston Museum of Science — with more than 100,000 square feet of exhibit space alone — the cost of heating and air conditioning forced it to curtail hours during the energy crisis of 1973.

It began using the Honeywell Boss service in 1975 and was able to avoid almost $17,000 in energy costs during the first six months, even though occupancy of the museum was higher and the weather was generally colder than during the comparable six months a year earlier.

"As a result of the Honeywell program, we are able to stretch our budget and stay open to the public longer hours than would otherwise have been the case," Edward Konetchy, supervisor of buildings and grounds for the museum, noted.

With the system performing start-stop programming of exhaust fans based on occupancy and start-stop programming of chillers based on outside air temperature, the museum cut its electricity use from 962,400 kW hours in the September to November time period in 1975 to 859,200 kW hours in the same 1976 time period. In the same 1975 period the museum used 3.5 million pounds of steam and only 2.1 million in 1976, despite the cooler weather.

In Los Angeles, Nissan Motors, the makers of Datsun cars, began using the Boss system to control cooling and ventilating in 1974 — a year which saw electric rates jump 77% in the area.

The system adjusts the equipment start-stop times based on the outside temperatures and matches the conditions in the building to actual occupancy patterns. In 1974 it helped cut electric consumption by 32% or 205,000 kW hours compared with 1973 and saved the firm $52,968 in 1975.

In another example, Ingersoll-Rand's corporate headquarters in Woodcliff Lake, N.J., was able to reduce energy costs an equivalent of 50 cents per square foot, according to Bill Grant, vice president of manufacturing.

Using the system for start and stop programming of all air handling equipment and pumps, the firm has reduced electrical consumption by more than 26% over a three-year period, while natural gas consumption dropped 18%, he indicated. In all, the firm

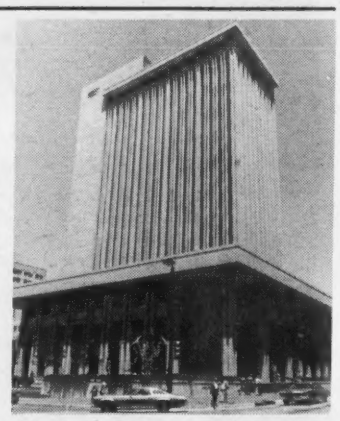
Computers and Energy

figures it saved $75,000 in 1975 in its 47,000 square foot facility.

In addition to monitoring and starting or stopping the air handling equipment, the Boss service is also used to monitor the computer room for temperature, humidity, smoke detection and the fire extinguishing system. If any of these factors is not correct the system sounds an alarm so that action can be taken to correct them.

It is also used to monitor all door contacts, guard tours, and access card readers used by the firm for security measures.

The Boss system, based on the Delta 2000 computers, uses sensors in the building being monitored to report on both the inside and outside temperatures of the building and the actual occupancy patterns. This information is sent via dedicated telephone times to the central computer system which adjusts the fans, air conditioners and heating units accordingly to maintain preset comfort levels.



Fidelity's high-rise office building is saving over $100,000 annually, thanks to the 'Boss.'

Windy City's IBM Plaza Recycles Heat to Conserve

By John P. Hebert
Of the CW Staff

CHICAGO – One IBM Plaza here, completed in 1971, is the first of what has become many IBM structures to use a computer system for controlling inside temperature and humidity.

The building rises 695 feet along the bank of the Chicago River and has a gross area of 1.8 million sq-ft in its 52 stories and three lower levels.

Its computerized energy management system has saved its owners about $50,000/mo since the energy reduction program began in 1973, according to Bill Abraham, manager of One IBM Plaza and vice-president of Scrivner & Co., the management contractor for the building.

The savings were achieved by redeploying the heat generated by the building's 5,800 occupants, elevators, computers and other machines, as well as controlling the ventilating and air conditioning systems, Abraham said.

Heat given off by people is a real factor, according to Abraham, who said one adult gives off about 240 BTUs per minute. Thus, heat is generated on the inside of major buildings at all

times, he explained.

The only part of any large building actually affected by the weather is its "skin," he noted. The computer system monitors both to achieve the desired balance.

Even in the "Windy City," when temperatures last winter often dropped to levels far below zero, only one-third of the building's boiler was ever used – and for a total of only 14.5 hours when the temperature dipped to -7°F or lower.

The system that monitors and controls the waste heat is based on a 65K IBM 1800 mainframe and associated IBM peripheral equipment: two 029 card punches, two 1442 card readers, two 1053 printers, an 1801 processor/controller and one 1810 disk storage device.

Readings on the outside temperature, dry-bulb humidity and dew point from a rooftop weather station are part of the system's input data.

In addition to weather variables, a total of 12 solar sensors placed at varying elevations monitor the "solar load" on the east, south and west faces of the building, Abraham said.

Inside the building, where excess heat is generated, the computer interfaces about 78 mechanical and electrical systems.

In all, information is received from about 1,100 points and is recorded as hard copy on the printer. Data is then stored on disk or used in the development and execution of programs at different times of the year.

Heat Redistribution

The computer system automatically turns off unwanted lights, regulates air conditioning and supervises the heat redistribution process.

This process, according to Abraham, involves taking the warmed air from each separate room and fan-forcing it through water filled coils.

The heated water is circulated to a central location where it is stored in heat pumps.

Three large refrigeration units provide cooling for the building's occupants in both summer and winter.

The computer takes all of the available information and decides – in any given area – how much air should be taken from the inside and outside to achieve the desired temperature and humidity, he said.

The computer and heat pump systems are about 10,000 BTU/KWh more efficient than fossil fuels, according to the plant manager, who further explained this is a three-to-one conservation of energy over direct electric heat.

Conservation Management

After the first year of operation, Scrivner personnel concentrated on the energy conservation plan. Abraham noted he and others elaborated on IBM's basic conservation management programs and massaged and modified them to achieve optimum use of the existing heat resources in the building.

In addition to executing the energy program, the system provides performance monitoring so the chief engineer can schedule his workload; provides data on equipment that needs repair; and provides data on previous performance maintenance operations used in rescheduling workloads.

Cost Figures

The system also supplies the accounting department with labor time and maintenance cost figures connected with repairs; records lamp burnouts; provides a status of items in spare parts and inventory; and identifies inventory items in short supply.

The cost outlay for the complete computerized energy management system will be paid back in energy savings in about three and one-third years, IBM estimated.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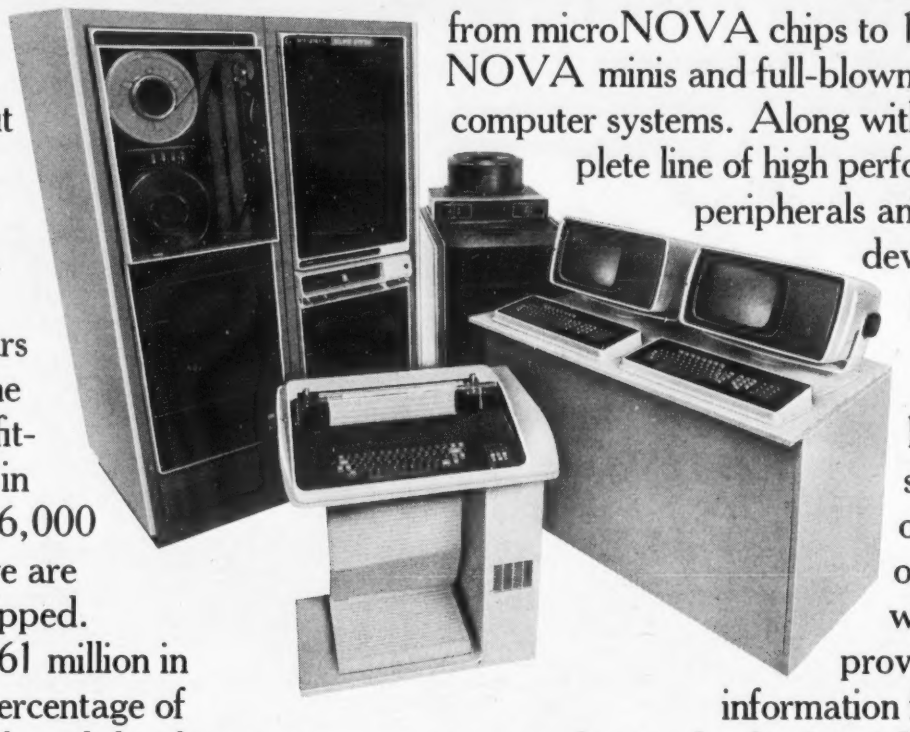

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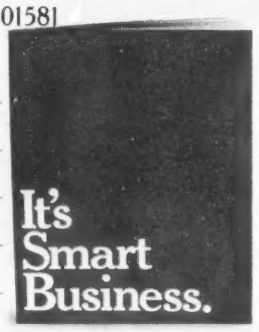

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Mini Takes Big Bite Out of Energy Bill At Restaurant Serving as Test Site

COLONIE, N.Y. — The Jolly Tiger Restaurant here is being used as a testing ground for a federally sponsored project designed to reduce the food industry's energy consumption through minicomputer monitoring.

The restaurant's energy bill has been reduced an estimated 40% to 50% over that of an equivalent restaurant without the monitoring system, officials said.

The Jolly Tiger, which is operated by Sambo's Restaurants, Inc., became the project site after

Computers and Energy

the firm initiated a three-part energy conservation program, according to company officials.

The firm first decided to reduce energy usage in small ways such as lowering room temperatures and replacing high wattage bulbs with lower wattages. The second phase involved remodeling existing restaurants with better insulation and the third phase was a research and development program in the use of solar panels, heat reclamation equipment and air conditioning systems using outside ambient air.

The firm's success caught the attention of the U.S. Energy Research and Development Agency (Erda), long anxious to find ways to reduce the food industry's energy use.

As a result, Erda and Sambo's agreed to combine their experience in a cooperative conservation project at a restaurant planned for construction in the summer of 1976 here in Colonie, which is just outside Albany. Both groups agreed that the area's extreme seasonal changes in temperature would provide a good test.

Erda Grant

Erda provided a $450,000 grant to cover the add-on cost of heat reclamation above the cost of conventional restaurant equipment.

The staff of the Atmospheric Science Research Center (ASRC) of the University of New York was asked to locate a data acquisition system, program it and direct the system's use. Based upon its experiences with Hewlett-Packard computers, the staff chose an HP desktop computer-based Model 3050B for the project.

The new 130-seat model restaurant is equipped with specialized heating, ventilating, air conditioning and food preparation equipment, including heat scavenging devices which, instead of exhausting the heat from grills and stoves to the outside, use the hot air to warm two large hot water tanks.

Another technique under test is the manipulation of economy cycles. This involves shifting warm or cool air from one area in a restaurant to another or automatically adjusting lighting levels to take best advantage of sunlight entering through the windows.

The mini is at the center of the energy control system. Through 175 sensors and transducers connected to heating, ventilating and air conditioning equipment, doors and lighting and kitchen fixtures, it measures the number of people entering the restaurant, the amount of heat lost in the walls, room temperature, lighting level, control settings of the heat pump system and temperature of the hot water tanks.

The system collects this information for analysis at a rate of four readings each second. It is also programmed to translate energy usage into dollars and cents to provide a printed readout, on request, at any time.

The ASRC estimates that the Colonie Jolly Tiger's energy bill already has been reduced by 40% to 50% over that of an equivalent restaurant without the monitoring system. Testing continues and final results will be available at the end of 1978. Erda and Sambo's have agreed to make data public at that time, an official noted.

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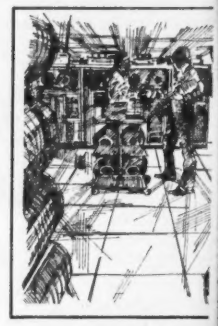

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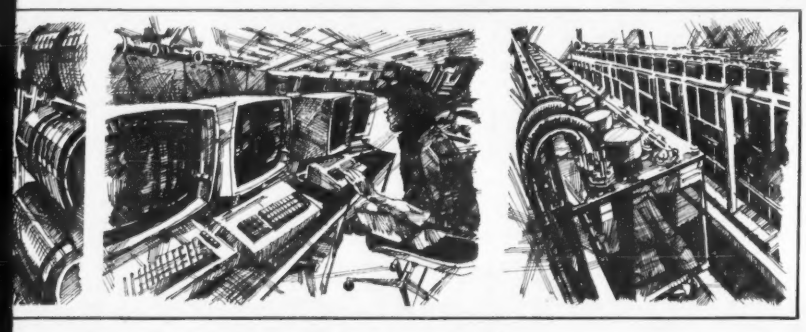

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We've opened the doors to 20 years of experience.

Representatives' Individual DP Efforts Encouraged

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Freedom of choice reigns in the U.S. House of Representatives, where every member can allocate up to $12,000 a year from his clerical budget for computer services.

One hundred sixty-nine out of a total of 435 representatives and four delegates in the House have acquired terminals or minicomputers under this program run by the Committee on House Administration, according to Boyd Alexander, director of House of Representatives Information Systems (HRIS).

The "439 pilot projects approach" is intended to let the members with their varying needs, interests and constituents decide what kind of computing will serve them best, Alexander said. HRIS and the new Policy Group on Information and Computers within the Administration Committee, which oversees the House computing function, act as "a kind of walk-in service bureau" and training center for the representatives and their staffs, the former deputy director of systems for the Office of Management and Budget added.

About 200 representatives have at least looked into the possibilities of computer capability for their offices. Members have everything from simple CRT terminals with acoustic couplers to full-fledged minicomputers. The Adminstration Committee makes it possible for members to transfer money from other accounts once they've set up a computer account, Alexander explained.

The Policy Group and HRIS are now working to build a member information network which got its start in 30 offices last year in a pilot project by the Commission on Information and Facilities.

Any member who has a Teletype-compatible terminal can join the network and access the Bill Status System, a summary of floor debate for each day, the Federal Assistance Programs Retrieval System and the U.S. Code, called Juris, which is run by the Department of Justice.

About 20 congressional offices are being phased into the system each month in order to prevent an overload of HRIS' facilities, Alexander said.

The Policy Group itself, chaired by DP enthusiast Rep. Charles Rose (D-N.C.) succeeded the Ad Hoc Computer Subcommittee in January as the primary developer of information and computer policy for the House and overseer of HRIS.

The fact that "ad hoc" is no longer contained in this organization's title indicates that computers are a permanent feature of House operations. The Policy Group's emphasis, however, will be on the information needs of Congress as a whole and the ways in which computers can be used to facilitate the exchange of data, Alexander said.

There is a "new awareness of automation as a resource with a dollar value and a sincere desire to use the computer — even among established committees and old members," he noted. Members have even asked to have computing capabilities in the Democratic and Republican cloakrooms and Rose has put portable terminals there, he added.

Rose himself is one of a group of seven members sharing a word-processing system for constituent correspondence and file maintenance driven by a Linolex minicomputer with 3M floppy disks.

Rep. Dave Stockman (R-Mich.) leases an IBM System 32 for approximately $1,600/mo. His administrative assistant does all the programming for the system and represents a "new breed" of staff people on Capitol Hill — people who understand the legislative process and computing at the same time, Alexander commented.

As part of its members-and-staff-as-users orientation, the Policy Group will stress training through frequent seminars and provide one telephone number to handle queries regarding the HRIS dual IBM 370/158-based computer operation. There will also be a "user assistance team" in HRIS as well.

Far from being concerned with House members' needs alone, however, the Policy Group is working to solve the information problems confronting House committees and Congress as a whole, Alexander stated.

Test processing of hearings and commit-

(Continued on Page 44)

Computing in Congress

Computing in Congress is new and has a long way to grow.

The information systems offices in the U.S. House of Representatives and the Senate are chiefly service bureaus, trying to serve users who are perhaps the most politically astute individuals in the country — but novices when they encounter machines with memory, telecommunications capability and data bases.

There is no standing policy-making group to deal with computing on Capitol Hill as a whole, but the heads of the computer operations in the House of Representatives, the Senate and the Library of Congress come together for particular projects. Their efforts in establishing the Legislative Information and Status System (Legis), expected to be operational sometime this fall, is a good example of a joint effort.

Legis will build on the bill-tracking system from the House, incorporate the procedural peculiarities of the Senate and employ the Scorpio retrieval language developed by the Library.

Similarly, a joint working group recently formed with representatives from the House, the Senate and the Government Printing Office (GPO) could help tie together separate text-processing efforts already under way and serve to further automate congressional printing.

Why is computing in Congress important?

In a speech here recently, former House Information Systems director Dr. Frank Ryan suggested the degree to which lawmakers are comfortable with the terminals in their own offices could influence their understanding of the issues they are confronting daily, from the rewrite of the Communications Act of 1934, to the recommendation that the post office get into electronic mail.

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Caution Marking Senate's Move To Automate Administrative Jobs

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — "The Senate has been in existence for over 200 years; we aren't a rescue operation for that body," John Swearingen, director of information services for the Senate, said here recently, reflecting the cautious approach this house of Congress has taken toward computing.

But while cautious, Swearingen and his staff at the Rules and Administration Committee, along with the Sergeant at Arms, who administers the computer center, and the Secretary of the Senate, are moving forward to automate those congressional functions that are amenable to computerization.

With the beginning of the 95th Congress in January, 93 senators had installed CRTs in their offices, giving them access to the Library of Congress' legislative data bases.

In addition, 46 committees, subcommittees and other Senate components had terminals linking them to the Library of Congress and the New York Times Information Bank.

Computing in Congress

The Senate also acquired a Comten, Inc. front-end to serve as a telecommunications switch for over 300 terminals and printers, according to Swearingen's Jan. 3 report to the Rules and Administration Committee.

Before this session of Congress is over, the Senate Computer Center will be moved to a new location on Capitol Hill; a second IBM 370/158 will be installed; the Legislative Information and Status System (Legis) should be up and accessible by terminals in the House, Senate and Library of Congress; and 80 senators should be using a correspondence management system to turn out close to a million letters to constituents each month, Swearingen said.

DP supporters Rep. Charles Rose (D-N.C.), left, and Sen. Howard W. Cannon (D-Neb.) are credited with leading Congress into the computer age.

A Little Overdue

The Senate has adopted computing, word processing and micrographics only in the last eight years. When Swearingen came to direct the Senate's computer services policy staff three years ago, Sen. Howard W. Cannon (D-Nev.) who chaired the Subcommittee on Computer Services until recently, was anxious to see the Senate get into computers and other forms of automation.

He felt the time for computing was even a little overdue, Swearingen said.

Today, the Senate's information services director has "no lack of suggestions for additional applications. We don't have to sell the concept of computing to senators and committees," Swearingen said.

According to Cannon, the Senate's first priority is to provide information and analysis to senators and their staffs to assist them in their legislative tasks.

Service to committees came next on the senator's list, followed by the work senators needed to do to respond "to the needs, concerns, and questions of their constituents," he noted.

A fourth area, identified as a potential beneficiary of automation, was administrative recordkeeping.

Swearingen and his staff of 11 people have the task of fleshing out these guidelines. The computer center, under the Sergeant of Arms, and staffed with a director and approximately 80 programmers and systems analysts, is responsible for carrying out the specific plans devised by the information services group.

Top Priority

At the top of the list for meeting Cannon's priorities is implementation of a system that will provide status, content, a summary, and cross-reference on all official activities of the Congress.

An upgrade of the bill status system operating in the House since February 1973, the system "automates the production system of a legislature — making bills into laws," Swearingen said, adding he hopes it will be ready for use sometime this fall.

Keeping track of these bills and resolutions is a voluminous job, Swearingen said. But what is a headache for humans is "a nice job for a computer," he noted.

In addition, the task creates a substantial data base and it is a good application for terminals, he added.

Unlike the House — where representatives can choose what terminal equipment they will install — the Senate has given each senator who requests it a Hazeltine 2000 CRT.

The difference between the House and the Senate in this area is one of size as well as philosophy, Swearingen said.

Where the House has 439 members, the Senate only has 100. While the House believes in giving its members an allowance

(Continued on Page 44)

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The Real Wizard on the Hill? The Library of Congress

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – The Library of Congress is the technological wizard of Capitol Hill.

Its Information Systems Office (ISO) is a service bureau in the sense that its chief computer applications provide legislative and bibliographic data bases to members of the House and the Senate and the departments in the Library itself, according to ISO Chief William R. Nugent.

The Library runs a mixed mainframe shop – an Amdahl Corp. 470V/6 and two IBM 370/158s. It plans to benchmark and select either an Amdahl 470V/7 or an IBM 3033 for use in the future.

The Library is also creating a telecommunications network that will exploit the compactness of Capitol Hill geography through private broadband transmission of data.

Finally, it has recognized the utility of microcomputers and is already using them to monitor response time on some of the 725 terminals connected to its system.

Nugent, who is also assistant director for information system development at the Library, stressed that all this equipment is intended to provide its users with an "information utility."

"Textual DP," another ISO watchword, indicates the Library's determination to provide House and Senate members with full text retrieval of bills, resolutions, *The Congressional Record* and all the other printed matter associated with Congress.

The Library runs nine bibliographic and

Computing in Congress

legislative data bases on Scorpio, the popular name for the Subject-Content-Oriented Retriever for Processing Information On-Line, a direct communication information retrieval system devised by the Library's Computer Applications Office.

Included are legislative information files for the past two and present Congresses, a bibliographic information file, a major issues file, the *Congressional Record*, the national referral center resource file and the Library of Congress computerized card catalog, the ISO director said.

The Library plans to close its card catalog in 1980, but this schedule depends on how quickly publications in the non-Roman languages can be incorporated into the data base, Nugent said.

To run these data bases, ISO operates on-line 85 hours a week. Its staff of just under 100 people provides the technical coordination and design for the Library's computer system, the applications soft-

William R. Nugent, chief of the Library of Congress Information Systems Office. His job: providing an "information utility."

ware development, a computer service center and standards, training and systems programming, Nugent said.

Another organization, the Bibliographic Services Office (BSO), contributes the systems analysis and programming for the bibliographic data bases.

The Library's equipment budget is approximately $6.3 million, according to Nugent. Most of the equipment is leased to allow for exchanges of machines when the technology changes or is improved, he said.

The Library's present 370/158s are a case in point, he suggested. Currently used for batch processing and as a backup for the Amdahl mainframe, which runs the teleprocessing network between the Library, the House and the Senate, the 158s aren't powerful enough, he stated.

Nugent will acquire either another Amdahl 470V/6 or an IBM 370/168 to serve as an interim machine until the 470V/7 and 3033 become available and can be benchmarked. The Library chose its present 470 over a 168 when it benchmarked these two mainframes using a synthetic jobstream based on a batch workload and found the Amdahl device 50% faster.

The 725 terminals connected to the 470 through two Comten 3670 front ends range from low-speed keyboard units to high-speed CRTs and printers, the ISO director said. Approximately 100 of these devices are located at the House and the Senate; the rest are found in the Library itself and in the Copyright Office.

Sycor and Four-Phase are popular terminal vendors in the Library's network, he added.

The system maintains a telecommunications control center, which for the past year has monitored over 150 telephone lines feeding into it to identify and locate communications problems. Using a Spectron Datascope, a Halcyon analyzer and a Hazeltine 2000 CRT, the center can determine which vendor to call.

The center also provides a place where frustrated users can call when they encounter equipment problems, Nugent said.

A tape management system, double-density disks with over 11 billion characters of on-line storage, 72 IBM 3330 and Itel 7330 disk drives and three IBM 1403 line printers complete the Library's system.

What will ISO be doing in the months ahead and over the next few years? It will continue to enhance and add to Scorpio, Nugent said. And the Library never lacks requests to mount new data bases.

(Continued on Page 44)

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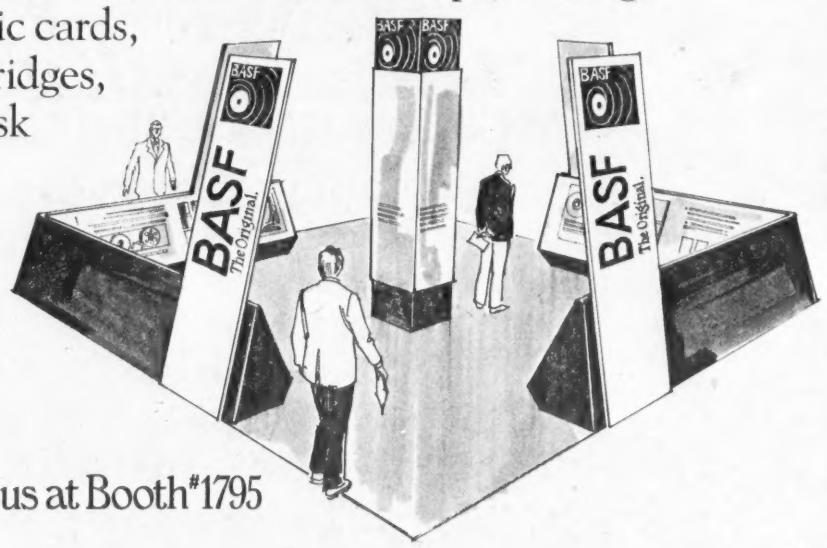

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Senate Moving Cautiously to Automate Legislative Job

(Continued from Page 40)

with which they can acquire computer services, the Senate would rather provide those services directly.

"The Senate likes to think of itself as the most democratic body in the country," Swearingen noted, suggesting that by starting off with the same CRTs, each senator's office will be as equal as every other senator's office.

Difficult Task for Legis

Under Legis, the House and the Senate will each collect and process the data generated in its own body. In this way, Swearingen said, it is hoped Legis will be truer to the procedural intricacies of both sides of Congress than is the bill tracking system.

Programming has been completed for the on-line data entry of records for bills, resolutions and amendments. Still ahead is the most difficult programming task for Legis: establishing the system for on-line data entry and validating status data, Swearingen stated.

On the Senate side, committees will be asked to report their status information to the system through terminals in their offices. The Secretary of the Senate will input data generated on the floor from terminals located there. By collecting data "at its source," Legis should provide accurate and fresh information, Swearingen said.

Each day, the House and Senate will trade their data bases and make all this information available to the terminals in congressional offices.

Legis will use an upgraded version of Scorpio, the retrieval language developed by the staff of the Library of Congress' Information Systems Office. Scorpio now includes full-text retrieval which will be incorporated into Legis, Swearingen noted.

In addition to bills, resolutions and amendments, the Legis data base will include all Presidential messages, all reports and communications from executive departments and agencies, treaties, protocols and international agreements and congressional oversight hearings, investigations and reports.

Swearingen expects the quality of Legis to be such that it will be acceptable as the official record of the Senate.

Correspondence Management

In another move to make the job of being a U.S. senator a little easier, the Rules and Administration Committee last month awarded a $4 million to $9 million contract to On-Line Systems, Inc. of Pittsburgh, Pa. to provide a computerized correspondence management system that could eventually serve the offices of up to 80 senators by turning out a million constituent letters a month.

The system to be programmed by the Pittsburgh firm calls for the computerized storage of "position paragraphs" that contain a senator's views on major issues. The system would select position paragraphs to answer a constituent letter raising particular issues, he explained.

The correspondence management system will also be able to give senators a printout by name, subject or subtopic on the letters their offices send to constituents. In addition, members of the Senate can receive "quick counts" of the amount of mail they receive on particular issues.

To date, 15 offices have participated in the test phase of the correspondence system, Swearingen indicated. New offices will be added to the system at a rate of three or four each month, permitting conversion of the Senate to the system by the end of the 95th Congress, he said.

The Real DP Wizard? Library of Congress

(Continued from Page 42)

There will be a file on General Accounting Office (GAO) decisions, investigations and reports as soon as GAO finishes preparing the data base, he noted.

In addition to its planned mainframe procurement, ISO is in the final stages of evaluating a request for proposal for four minicomputers to run data entry applications. Nugent said he is looking for "extremely high reliability" from these systems, which would be located at the Copyright Office for cataloging, at the Congressional Reference Service to handle inquiry control, at the Library's division for the blind and physically handicapped as one node in a multistate network and at ISO itself for program development.

Working With Wands

Nugent and his staff are currently working with an IBM System 7 to develop wand reader techniques to be used in circulation control and in materials handling at the Library.

With storage of data ever a major problem at the Library, ISO hopes to do something with mass storage devices by the end of fiscal year 1978.

The Department of Defense has examined the concept of "failure-tolerant" or more reliable computing, and the Library is considering the implementation of this idea, too, through duplex systems.

Individual DP Efforts Encouraged in House

(Continued from Page 38)

tee reports has long required a great deal of time and money. In a move to improve this aspect of the legislative process, the House recently contracted with Atex, Inc., an electronic publishing house, to install its CRT terminal-oriented composition and editing system.

A Digital Equipment Corp. PDP-11 minicomputer is now used in the House to capture, edit and print hearings and bills. Programmed to operate in a redundant mode, the entire editing, file management and composition system can support 96 users at one time.

Total dollar savings in the Congressional Printing and Binding Fund, estimated at $2.95 million for 1977, are expected to jump to $10 million in 1978. Turnaround time for hearing transcripts from the Government Printing Office that now takes more than three months should be reduced to less than four weeks, Alexander said.

The Policy Group on Information and Computers also plans to offer the committees in the House more commercial econometric modeling data in addition to the capability of developing their own. Computer graphics would also be of help to committees in presenting their reports to individual representatives and their staffs.

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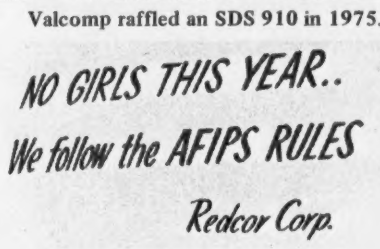


No Show Biz in '70

Mickey bids welcome to Anaheim in 1975.

Picturephone was in Vegas in '71. Where is it now?

DG ringmaster draws crowds in '76.

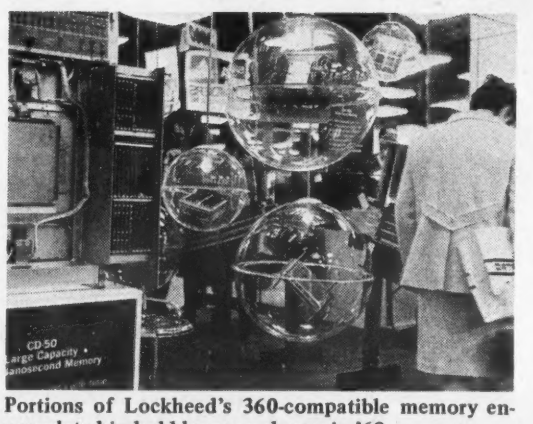
Atlantic City, 1970

A farewell to the industry? RCA, Spring 1971.

At a Glance

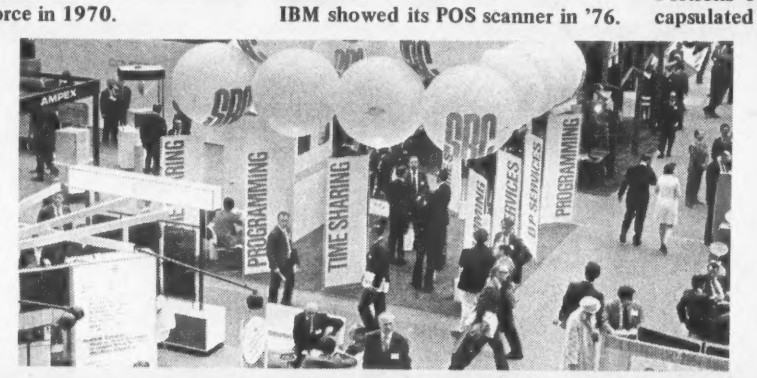
Telex, Sanders and Xerox were there in force in 1970.

IBM showed its POS scanner in '76.

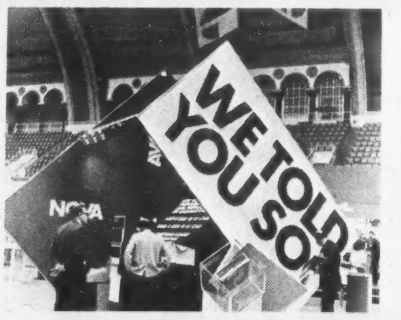


Portions of Lockheed's 360-compatible memory encapsulated in bubbles were shown in '69.

Yes, Digital Equipment Corp. used to attend — 1970.



Service Bureau Corp. was a part of the IBM family in 1970.



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Europeans Leading the Way in EFT Developments,

By Toni Wiseman
Of the CW Staff

NEW YORK — Europe is a continent of concentrated commercial banking and in many instances has assumed a leadership role in electronic funds transfer systems (EFTS), such as in the implementation of automated clearing houses.

Point-of-sale (POS) systems, on the other hand, are virtually nonexistent in most European countries, according to William H. Moore, vice-president of Payment Systems, Inc. (PSI).

Seven of the free world's 10 largest banks, in terms of deposits, are in France, England and Germany, Moore told an audience at a PSI-sponsored conference here on EFT in Europe. These three countries, along with Switzerland, the Netherlands and Italy account for 24 of the world's 50 largest banks. The U.S. in contrast, has only nine banks on the top 50 list, Moore noted.

European banks are at the forefront of the EFT technology in many areas, he noted. In Belgium, for instance, a check truncation scheme has been operating since late 1974. Checks for 25,000 francs or less are stopped at the bank of first deposit, and the information from them is recorded and transmitted to the paying bank.

In The Netherlands, the Municipal Giro of Amsterdam is on the verge of issuing a two-sided card. One side will contain a proprietary designation for use in cash dispensers, the other, a blue, white and gold VISA designation for use as a credit card, he said. The magnetic stripe is completely embedded in the card beneath the card logotypes, he noted.

Banks Unrestricted

Banks in Europe are large for a number of reasons. First, their charters allow them to operate nationwide without confining them to a province or state. Second, they are virtually unrestricted in the services they may offer, and finally, they are not restricted as to the number of branches they may operate.

"Switzerland as an example, has one bank branch per 1,400 persons or about four times as many branches per capita as does the U.S.," he stated. Barclays Bank in England has 5,000 branches, he added.

Other factors positively influencing European banking are the fact that banks are "relatively unfettered in their ability to merge with and acquire other financial institutions.

Full function automated teller machines (ATM) are a comparatively recent phenomenon in European countries, but cash dispensers in varying forms have been installed in England since 1967 and in Sweden since 1968, Moore said. There are more than 4,000 ATMs and cash dispensers throughout Europe — compared with an estimated 5,500 in the U.S. — more than 50% of which are installed in Great Britain, he noted.

However, "full function ATMs are just coming on the scene in Britain. [The Battelle Institute's] panel of EFT experts predicts a fourfold increase in European installations of cash dispensers and automated tellers by 1980," he said.

Besides their proliferation, European cash dispensers are notable for their innovative techniques, he said. Some British machines, for instance, are activated by punched hole cards which are issued to the customer as requested. The cards are then collected by the machines as used and are employed to debit the customer's account for the amount of cash which has been dispensed, Moore explained.

European banks, in many cases, are the technological leaders in EFT, but point-of-sale systems are almost nonexistent.

In France, the Cart Bleue group of four major banks operates a network of almost 600 cash dispensers which, although they are installed in the outside walls of specific bank offices, are available to any Cart Bleue customer of any bank, he said, noting that 40 Swiss banks operate 80 cash dispensers on a similar basis.

"The one great void that seems to exist in European EFT to date is POS terminal system developments," Moore indicated. "It is certainly fair to say that, though much study in under way, for most of Europe POS has not yet become a fertile area for EFT applications. This is atrributable in part to the continued heavy use of cash for POS payments and in part to the failure of European card plans to mature to the extent that terminal systems are economically attractive," Moore told the audience of bankers.

POS development will have a head start in Europe, however, since many European banks have already begun to operate large online networks connecting their branches nationwide, he noted.

"It should be a relatively simple matter to tie in retailer POS systems to these broad-scale banking networks.

Finally, Europe boasts the Eurocheque system, a payment method that employs a card in conjunction with a preprinted guaranteed check.

Leaving Americans to Follow in Their Wake

By Toni Wiseman
Of the CW Staff

NEW YORK — Ninety-four percent of all retail payments in the UK are still made in cash, despite the widespread terminal networks installed there today, according to Simon Evans, senior consultant for the Inter Bank Research Organization.

And that figure should hold true "for some time," Evans told an audience at a recent conference here sponsored by Payment Systems, Inc.

The banking industry in the UK is characterized by the relatively few banks which offer retail banking services, the nationwide character of the institutions and the existence of only one automated clearinghouse (ACH) which serves all banks and their customers, Evans said. In addition, the banks have extensive networks of computer terminals, primarily used as data collection systems, he noted. There are five categories of banks offering money transmission services in the UK: commercial banks owned by shareholders; the Co-Operative Bank, owned by members of Co-Operative Societies; trustee savings banks, which are mutual banks; the National Giro which is part of the Post Office; and other British and foreign banks operating in the UK but not primarily concerned with money transmission business.

Despite Britain's widespread terminal network, 60% of employees are still paid in cash.

"The lion's share of money transmission business belongs to the commercial banks and, of these, four account for over 75% of all money transmission business, he said.

"The UK and the U.S. differ considerably in the way payments are made," he noted. "The UK is more cash-oriented with nearly 60% of employees still being paid in cash. But people with bank accounts, and just under half the working population in England and Wales have an account with a checkbook facility, use a wide range of payment services," he said.

"Furthermore, the rate of growth of automated payment services such as direct debits is faster than that of nonautomated services," he added.

The UK has some 2,058 cash dispensers and 206 autotellers. Of these, 500 are in-bank lobby units, 1,740 are through-the-wall units and 24 are nonbank lobby units, he indicated.

Of the cash dispensers, 1,390 are off-line and only 866 are on-line, but the trend is definitely toward on-line operation, he added. He also noted that only 856 of the cash dispensers offer variable amounts, while most are fixed at 10 pounds or 20 pounds.

The UK ACH is called the Bankers' Automated Clearing Service (Bacs) and, in addition to providing ACH services, Bacs also houses the UK Swift concentrator and will probably house the switching system for a new Chips type system, Evans said.

Bacs processed over 1 million automated transfers per working day in 1976, or a total of 265 million. Of these, 114 million were standing orders, 50 million were automated credits and 101 million were direct debits, Evans stated, noting that nearly 90% of the automated credits were for payroll or pensions. Over three million people out of a working population of 24.5 million receive their salary credit automatically, he noted.

"Bacs, while very successful and handling the largest volume of paperless transfers of any ACH in the world, has a large potential market," Evans indicated, since many bank account holders still make a lot of regular payments by check or cash.

Bacs is owned by the major banks and used by all clearing banks, he noted. Banks submit tapes to Bacs daily and receive tapes daily. With the approval of its bank, a corporation may also submit tapes directly to Bacs for both debits and credits.

"The government uses Bacs for some purposes but it is not, numerically speaking, an important user," Evans said.

Bacs is at present a batch processing, tape-based system; transfers through the system take a total of three days, as with paper vouchers in the UK, he said.

POS Possibilities

While no point-of-sale electronic funds transfer (EFT) systems are currently operating in the UK, Evans predicted an extensive system in the near future if retail EFT can be shown to be economically feasible. The terminals would be used for both debit and credit transfers and would be available on a cooperative basis — that is to say individual banks would probably install the terminals in the retail outlets whose bank accounts they had, he said.

"But the terminals would be usable by cardholders of any bank. Unlike the U.S., we believe there is no sense in banks competing to install terminals. What they should be doing is competing on the services offered through those terminals. We believe it should be possible to specify terminals in such a way that any bank will be free to offer the services it wants to its cardholders," he stated.

Predominantly Bank-Oriented

European EFT Systems Differ Greatly Among Themselves

By Toni Wiseman
Of the CW Staff

NEW YORK — While there is a great difference between the implementation status of electronic funds transfer (EFT) systems in Europe and the U.S., the European systems also differ greatly among themselves, attendees of a seminar were told here recently.

Germany, for instance, is looked to as a leader in European technological innovation. But so far, German bank ventures into new payment technologies have been cautious, according to Dr. Ulrich Weiss, manager of the Frankfurt District for Deutsche Bank, AG.

The German banking system amounts to 45,000 branches offering full banking services or 1,412 person/branch, not counting about 22,000 post offices, he said.

In 1976, there were 13.4 billion cashless transactions in West Germany compared with 33 billion in the U.S. Of those 13.4 billion, 7.5 billion or 63% were funds transfers, 2.7 billion or 22.9% were direct debits and 1.5 billion or 13.4% were checks, Weiss said, noting transfers and check transactions have decreased since 1966 while direct debits have grown.

Separate Clearing Systems

There are three banking systems — cooperative, commercial and savings — each with its own clearing system, he added.

"West Germany has no automated teller machines (ATMs) or point-of-sale (POS) terminals," and its cash dispensers "are more experimental than anything else," Weiss said, adding there are no bank credit cards either.

According to Weiss three elements keep West Germany from leaping into EFT: competition, costs and bank customer expectations.

The competitive environment is such that

Germany, Europe's technological leader, remains cautious in developing new payment techniques.

with no limitation on the number of branches or services a bank can offer, there is very little or no room for EFT or ATM systems offered by one group, Weiss stated.

In addition, the costs of such systems bear no sound relation to the return on investment or the utility to customers, he indicated. In the U.S., for instance, transactions cost a bank 17 cents per check, 55 cents per credit card and $1.25 via EFT.

Cash Still Cheapest

"Despite technological innovations, cash is still the least expensive and most efficient means of payment," Weiss maintained.

He indicated, however, that about 50% of the currency bills in Germany are being replaced with special bills which can be identified and sorted automatically. These bills can also activate vending machines, which will be less expensive to operate than ATMs, he said.

Weiss pointed out that while there are about 500 million credit cards in the U.S., only some 50 million are bank cards, "which means that nonbank entities are getting a considerable amount of banking business."

Guarantee System

In 1966, West German banks jointly decided against bank credit cards in favor of a check guarantee card which they considered more convenient and efficient as well as less costly, Weiss continued.

By 1967, they had developed a uniform guarantee system which expanded to a European system known as Eurocheque that operates in 40 countries in Europe and North Africa, he said.

Despite the lack of credit cards and ATMs, there is a great deal of EFT activity in West Germany, but only among the banks themselves, Weiss said.

Giro Accounts

In the Netherlands, the Bankgirocentrale NV (BGC) processes more than one million automated payments each day for Dutch financial institutions, aiding in the transition from cash to cashless payments, according to W.J. Dalmijn, director of BGC.

BGC was set up in 1967 as a clearinghouse for the centralized processing of transfer orders. This was necessary because firms decided they wanted to pay their employees by giro — a system of checkless credit transfers between banks — which meant each employee had to have a giro account, he said.

In a country of 50 million inhabitants, there are more than 10 million checking and giro accounts and 20 million savings accounts, he noted.

BGC's processing load has grown from 61.6 million transactions in 1972 to 319.3 million in 1976, Dalmijn stated. Of these, 73 million were machine-readable payment orders, 68 million converted payment orders, 44.7 direct debits, 54.7 giro acceptance card transactions and 78.9 million guaranteed checks.

Thus, apart from transactions in which both payer and payee hold accounts at the same bank, practically all bank giro transactions pass through the center and are handled by its Burroughs Corp. B7700 and B6700.

BGC accepts payment orders recorded on diskettes and mini cassette tapes as well as more conventional magnetic tapes, he said, noting that banks with computers of their own can also receive tapes in return to update their files and print statements.

Success in Denmark

Denmark's automated clearing operation is also a successful one, even though it has to compete with a government-subsidized postal giro, according to Peder Schlegel, director of the Danish Transfer Center for Financial Institutions.

In fact, out of a potential 75 million transactions, 30 million were transfers in 1977 and that number is growing, he stated.

Like those in the Netherlands, "ATMs and cash dispensers have not yet been introduced and probably will not be for some time because of the justification and the consequences of competition which could bring in political interference," Schlegel said.

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Chase Chooses Specialized Front End

Net Transferring Funds Worldwide Without Host CPU

By Nancy French
Of the CW Staff

NEW YORK — The Chase Manhattan Bank here chóse a specialized communications controller that front ends a network of five large minicomputers to transfer funds electronically for corporate customers world wide, according to Harvey Hershkowitz, the bank's vice-president and manager of data communications.

The system, which communicates with at least 10 different international and domestic computer networks with as many as a dozen different interfaces and distinctly different protocols, uses no mainframe. The communications functions are handled exclusively by a dual-processor Control Data Corp. M1000, and the transfer application has been "fragmented" and distributed among five Digital Equipment Corp. PDP-11/70 minicomputers, according to Hershkowitz. Each of the five "hosts" can access any of the other four, he said.

Functions Separated

The bank separated the communications functions from the application processing and chose a distributed system "because we didn't think a mainframe could do the whole job," Hershkowitz told a Computerworld Computer Caravan audience here recently.

Without a specialized controller, on the other hand, maintaining the dozen different protocols needed in each mini wouldn't have left much work space, he said.

The bank's attitude is "the customer is right." That's fine, but it makes things "more complex on the receiving side," he said.

Because Chase must be able to communicate with international systems such as Swift and Chips and domestic nets such as the Bank Wire and the Federal Reserve Wire, as well as domestic and international commercial carriers such as TWX, Telex and even the Interactive Data Corp. timesharing system, the bank wanted a system that was "flexible," he said.

"Flexible" meant a system that could compensate for all the different languages, speeds, message formats and controls on data received by the communications controller. The bank's system has to look like a terminal to these networks, he said.

Processors Jobs

The communications processor also handles terminal control, error control and message assembly and disassembly, as well as code, speed and format conversion, before passing on transfers to the application processor, Hershkowitz said. It also takes care of edit validation as well as checking message sequence numbers — one part of the validation check.

The processor also handles statistics and reports. This is important since many customers must be billed back for these transactions, he explained.

"In addition," he said, "we must have online retrieval in case a message gets lost or in case one of our customers calls and says the paper jammed on his Telex machine and he didn't receive our message."

Algorithms Validated

The electronic funds transfer (EFT) application itself is distributed among the five DEC minis. An Automated Wire System does the test key validation, checking the test key word imbedded in each message against an algorithm to assure its validity. The remaining functions include: Domestic Transfer System, the International Transfer System, the Federal Reserve Book entry System and the Reserve Position Accumulator, which keeps track of the balance in the Federal Reserve Bank minute by minute.

"We don't want to have more than the minimum balance required in the Federal Reserve," Hershkowitz explained, "because that money earns no interest. When the balance grows too large, we can take some out and buy government securities. Conversely, when the balance drops, more money can be deposited," he said.

The bank treasurer can make such a transfer automatically from a terminal in his office, he added.

With the modular configuration, changes to the communications system will have no impact on applications processing, and vice versa, he said. The system can also be expanded modulary to meet changing needs.

Protection Critical

Hershkowitz explained somewhat apologetically that the redundancy built into the system may look "like overkill" to some, but to the bank, message protection is critical. "No matter what kind of failure occurs, we have to be able to recover and restart without losing anything," he said.

Each M1000 handles half the incoming lines, he explained, and all lines are hardwired to both processors. In case of failure no switch is necessary. A software command immediately tells the operational system to service all lines, he explained.

The system is further buttressed by various levels of patches and switches to enable the bank to switch virtually any CRT to any other controller, or any controller to any other modem, he said.

A gang switch allows any PDP-11 to be substituted for any of the application processors, Hershkowitz said, adding the bank has two or three spares for just such contingencies. Although he could not say precisely what the uptime of the system was, he said it was "in the high 99s."

'War Room'

A central operations group in a "war room" can test and isolate most problems quickly, or at least patch in different gear, he indicated.

The bank uses Four-Phase IV/70 terminals and controllers, he said, and GE Terminet printers.

Money transfer is not a 24-hour a day job, he said; however, it's more than just 9 to 5 New York time, because the needs of customers in different time zones must be accommodated. Nevertheless, the system must be up 24 hours a day, seven days a week for international corporate administrative message traffic, he explained. Therefore, system changes must be made on-line via table entries, he added.

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The Waves of Change

By Charles P. Lecht

This week, in the latest excerpt from his soon-to-be-published book, Lecht 'speaks the unspeakable' by declaring that the notion that automation creates jobs is only an illusion. This, he contends as he explores the hows and whys of expanding DP budgets, is a result of the shifting flow of DP dollars.

CHAPTER VII

While net vendor shipments of DP systems may have declined in 1975, user spending actually increased, in many instances because of pressures generated by the recession to achieve improved productivity, efficiency and management control.

With the recession somewhat abated, 1976 may have topped the peak growth record set in 1974. However, the user spending mix will continue to change in 1977, with the most apparent shift being in the continuing decline of computer hardware as a percentage of the overall total user budget.

For example, Figure VII-1 shows user budget structures for the large Fortune 1,000-type customers. It can be seen that compared with the early 1970s, "people costs" are expected to climb by 8% to 10% to a level representing nearly 50% of the users' current budget, while hardware costs grow at a lesser rate, i.e., 6% to 7% last year.

This offers a dramatic contrast to the estimated 15% to 20% increase in expenditures for vendor-supplied application packages, unbundled program products and other utilities and software.

Finally, miscellaneous costs for such products as remote terminals, supplies, communication lines, multiplexers, concentrators and modems grew by 12% to 14% in 1976.

No Choice for Users

Recent user surveys also show that many customers (especially IBM's) have no choice but to upgrade and expand their systems because, for example, the medium-scale user is typically running two and a half shifts and CPUs are approaching the 100% utilization level.

For example, Advanced Computing Technique's own installation, a 370/145 using CICS and OS/VS, frequently resulted in extremely high CPU activity, even from minimal user input. On the occasions when the system was operational in a restrictive environment (created solely by default), a single user input resulted in the deactivation of other partitions' tasks as the CPU became totally committed to the processing of that user input. In this instance, where paging reached 30-plus pages per second, CPU utilization reached 35% to 45% to handle one transaction.

Alternatives left to users facing this and similar situations are clear: Either buy high-priced and not always successful IBM field support services to correct software deficiencies or upgrade. Many users with five-year plans already in place (and thus not easily alterable) were forced by the exigencies of those plans to upgrade their facilities in spite of temporary recession.

Another factor in the trend to overall DP budget enlargement is that DP customers throughout the world (but especially in the U.S.) have apparently been deferring decisions on computer procurements or upgrades for perhaps too long a period; in view of this, and given that delivery lead times average 12 to 18 months, the consensus seems to be that this year should prove exceedingly strong for most (but not all) manufacturers.

But, perhaps, a major factor in the increasing DP budget situation derives from a phenomenon whose character compels us to break the longstanding taboo that often drives discussion of shifting white-collar budgetary allocations underground. Figure VII-2 says it all: As time passes in corporations heavily committed to automation, less and less is being performed manually, more and more automatically (i.e., through the use of computer-based systems).

Each heretofore manually conducted, now automated, operation must serve to force the shift of clerical dollars from rooms housing seas of white-collar workers to rooms containing automata. Also, the percentage shift of these funds is occurring at a rate in excess of corporate growth rates and will continue to do so throughout the 1980s.

Perhaps it is time to speak the unspeakable. It appears clear to me that the long-held notion that automation merely *creates* new jobs has proven itself to have been illusory. Dr. Carl Hammer, Univac's international sage, gave an example of this in a recent *Computerworld* article. He notes the impact of "chip" technology on certain traditional, mechanical industries and predicts that the programmer, too, will feel it as the problems of verifying software are met at the chip level.

A curious phenomenon relating to the shift of white-collar dollars to "steel-belted" circuitry has to do with management's perception of the process. Automation tends to transform white-collar wastage heretofore flowing from seas of worker desks into an apparent high-pressure cash flow out of the computer room. While management was accustomed to the former (almost to the point of obliviousness), the now clearer (albeit lesser) amounts of wastage occurring in the latter engenders in management a certain nervousness which suggests a thermodynamic law analogy.

Thus, with all other economic related things held constant, reducing the floor space on which work is to be performed heats up management and reduces its patience. DP managers faced with explaining increases in budgetary requirements in the face of this phenomenon are frequently at a loss to do so. But then, we hope the waves of change caused by automation infusion will carry along with their increases in automation efficiencies decreases in management insecurities.

The European Situation

Any evaluation of worldwide DP budgeting trends must, of course, address the economic situation in Europe. According to the "Computer Industry" letter published by Gideon Gartner of Oppenheimer & Co., projections of real GNP growth rates in Europe in 1976 showed Germany with 5% to 6%, France with 5%, the United Kingdom with from .5% to 2% and Italy with a rate of from 0 to 2% (figures which do not reflect the probable impact of Opec's decision to hike oil prices in 1976-77).

Projected changes in consumer prices for 1976 included increases of 5% for Germany, 11% for France, 15% to 17% for the United Kingdom and 16% to 18% for Italy. The Gartner analysis also suggested that the rise in consumer prices may be taken as a direct reflection of widespread wage inflation in Europe, which persists despite the imposition of wage controls in some countries.

These relatively high inflation rates, when viewed in conjunction with the average 15% to 20% *decrease* in price per work unit in computing outside the U.S., must clearly have their impact on DP budgeting in Europe — probably an expansionary one.

According to a Univac presentation in Paris, the per-capita values of installed computers were $189 in the U.S., $91 in France, $70 in the UK, $30 in Italy and $28 in Spain. These last two figures may help to explain why Italy and Spain remained such

(Continued on Page 54)

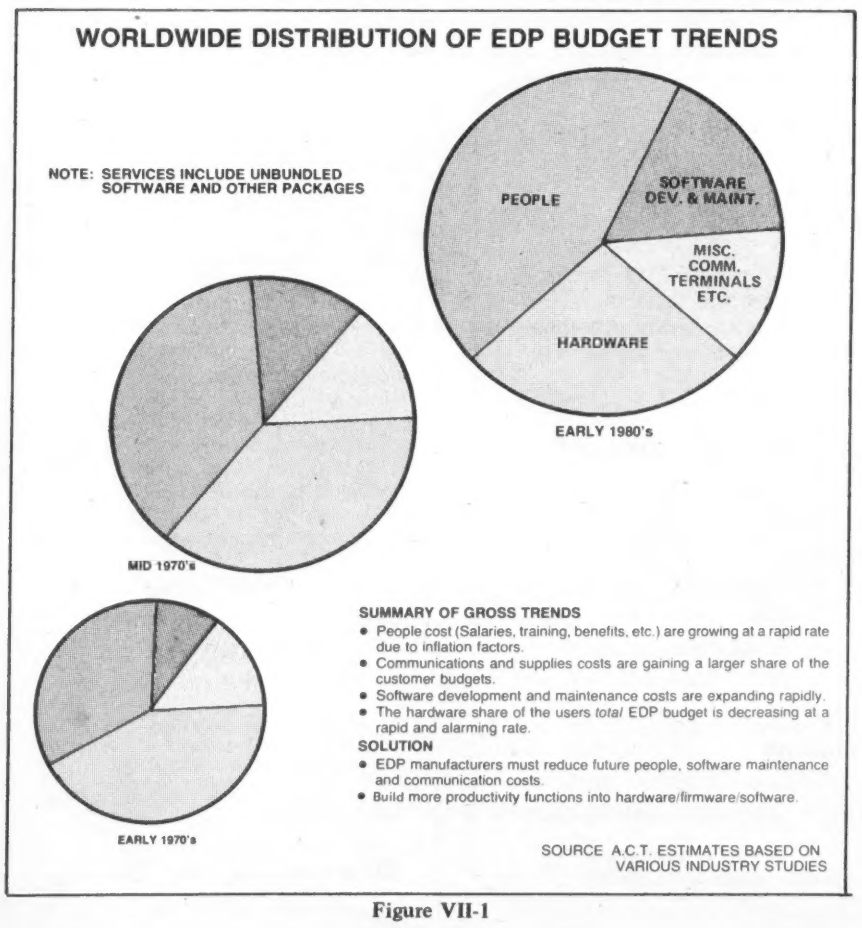

Figure VII-1

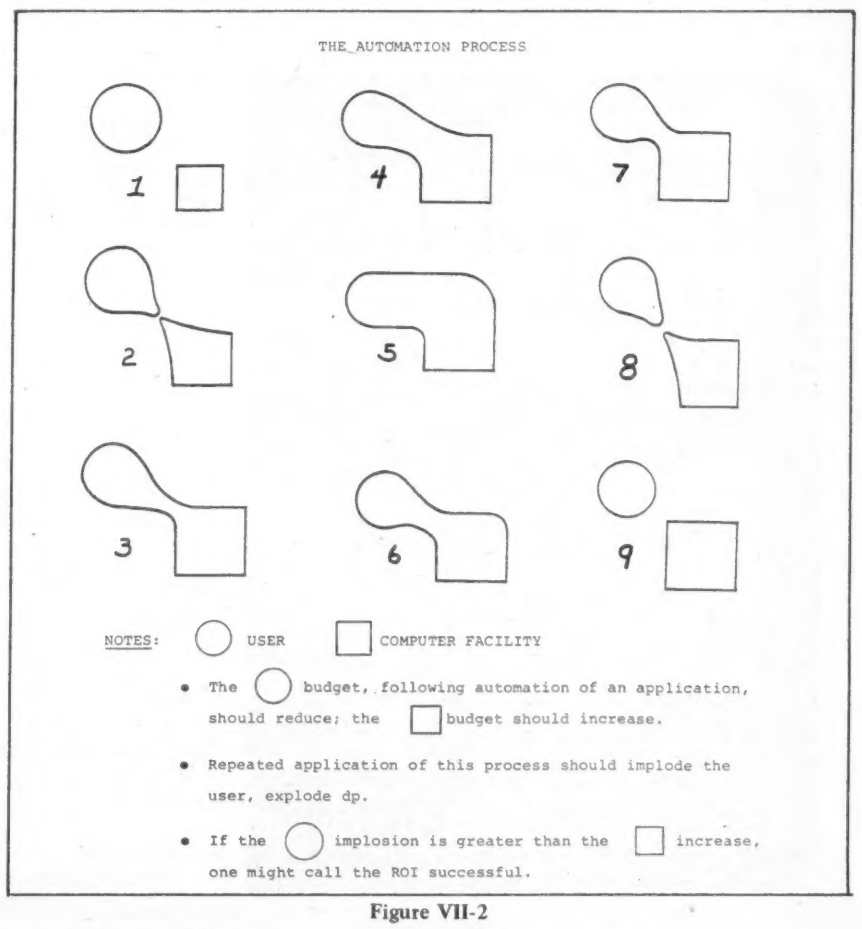

Figure VII-2

The Waves of Change

(Continued from Page 53)

strong DP markets right through the 1974-75 recession.

Univac also saw DP expenditures in Europe doubling by 1980 to $40 billion. Expressed as a percent of total expenditures, the general-purpose computer share would, it was said, decline from 30% to 22% in 1980, with terminals, which in 1975 accounted for a 10% share, increasing to 18% and communications products increasing from 11% to 13% in 1980.

While over the long term I expect *centralized* DP equipment expenditures to grow at a far slower rate than overall user spending, possibly even declining after 1980, the *total* DP expenditure (given the latest mini and micro-mini offerings) will not.

Another Look at Priorities

To summarize, people costs, salaries, training, benefits, etc. are growing at an accelerated rate in some countries because of persisting patterns of high inflation. Communications costs, including terminals, modems, multiplexers, concentrators and supplies, are gaining a larger share of customer budgets. Software development, maintenance and service costs are also rising swiftly.

In contrast, the central site hardware share of the user's total DP expenditures is decreasing at a rapid rate. As a result, some manufacturers may not be participating in the real action of the late 70s and early 80s. As stated in Chapter IV, current and future product priorities (as established under manufacturer R&D budgets) must be reevaluated to determine whether the vendor is properly addressing his potential share of the rapidly growing market and promising product areas.

Innovative DP manufacturers must somehow reduce future personnel, software maintenance and communications costs by building more productivity functions into hardware, firmware and software.

This also reinforces a point which we made in an earlier chapter; namely, that a Mips-per-dollar (Mips meaning millions of instructions per second) strategy is ultimately doomed to failure. For example, some major manufacturers may be focusing their limited R&D resources on building high performance "super number crunchers." Consequently, these vendors may not be able to afford to participate in other exciting growth areas as well, such as terminals, communications nodal processors, software and network systems, among other potentially more profitable opportunities.

The growth of planning and development budgets at a steadily ascending rate perhaps reflects the elevated priority that applications software is assigned in many user operations today. The decline of hardware spending will be due both to lower unit costs for all hardware, as well as to the greater emphasis on low-end, low-cost equipment (more notably minicomputers and intelligent or microprogrammed terminals).

It might initially be thought that by the mid-1980s this decline will reflect a relative saturation of the market for medium- to large-scale mainframes or computers as we know them today. However, we should bear in mind that the definition of what we currently refer to as a "medium- to large-scale" processor will certainly have changed substantially by 1985.

IBM's recent Model 3033 introduction may appear to contradict this trend; i.e., the 3033 offers roughly 1.7 times the 168-3's raw performance at nearly .7 times the 168-3's prices or 2.4 times the 168-3's performance/price. Assuming that IBM can ship about 2,000 mainframes (Model 3033s alone) by 1980, this represents greater than 4 Mips times 2,000 or "greater than 8 Bips" (billions of instructions per second) capability at that time.

The key question is: Will the IBM customer base (158 and 168 users) be able to absorb this "greater than 8 Bip" capacity with new data base/data communications applications by 1980?

Apparently AT&T, in view of its recent letter of intent to order 85 Model 3033 systems, is bent on helping out — a curious but not unexpected phenomenon. Letters of intent are not contracts.

Salary Growth

The steady but relatively small growth of salaries as a percentage of the users' total budgets can be partly explained by increased vendor productivity and support and by offerings from service companies, all designed to reduce user personnel requirements.

This should be more evident or effective for low-end systems (e.g., IBM System/32, Burroughs B-80, the Univac BC line, Honeywell Level 6, etc.). For instance, IBM provides audio self-instructional programs which teach the unskilled operator how to run the System/32, and Univac's BC/7 offers a programmerless capability called "Pixie."

However, total DP employment will continue to increase. Staffing of all user installations in the U.S. was estimated at 1.2 million employees in 1975 (including well over 200,000 programmers) and is projected to rise to approximately 3.8 million by 1980 and 4.5 millon in 1985 (with a need for more than 500,000 programmers). This represents a rise from 1.5% to 2.9% and finally an estimated 4.2% of the total labor force at that time.

Possible Shortage?

A major question is whether the requirement for experienced analysts, programmers and operators can be met by schools or manufacturers in the 1980-85 period. The shortage of skilled professionals and capable project management-level personnel needed to implement complex data base/data communications systems may severely inhibit the growth of this market in the mid-1980s.

In the U.S. alone, requirements for DP personnel in paraprofessional categories may reach 2 million individuals in the eight-year period ending in 1985. This represents the entry of at least 200,000 individuals annually, roughly the equivalent of 25% of the college graduates each year!

Obviously, this is an unrealistic requirement and points to a potentially significant inhibitor of industry growth. Recent statements made by spokesmen for computer school businesses suggest that the disparity between the industry's appetite for trained personnel and the ability of the institutions to satisfy it may be corrected by the migration of many workers from other fields to the glamour and income of careers in computers. We, however, do not feel that this can immediately answer the question raised by the growing technical complexity of current and emerging systems.

Furthermore, *existing* staff must be qualitatively upgraded. This is particularly true of systems analysts, whose skills are vital to the implementation of complex, data communications-oriented applications and must therefore be kept up-to-date.

The skills of DP managers are also still too weak. Computing is still so new that it has little history and thus lacks a reservoir of experience on which it could draw routinely. For DP managers, this means growing difficulty in managing large projects, increasingly costly resources and problems of the sort one might expect with temperamental, professional people.

Vendor hardware, software and user relations will also have to be improved to ensure greater manufacturer responsibility for systems failure. In the future such failures will have profound and potentially serious consequences.

Improved contracting policies and practices will be required, as will more realistic user attitudes in regard to planning for the eventuality of system failures. Dick Brandon's latest book on contracting, *Data Processing Contracts: Structure, Contents, and Negotiation*, will see increasing usage.

Overstated Requirement

Chapter I suggested that a solution to the shortage of experienced personnel (and other complex issues cited earlier) could be the incorporation of more end-user functions in hardware/firmware, such as ease of operation, and other, labor-intensive activities or functions. An illustration of one recent product that partly achieves this goal is the IBM 3800 laser printer and 3850 mass storage system.

Xerox and Kodak are both trying to capitalize on the burgeoning personnel requirement for people who must think by offering products which can do so with fewer headaches. IBM can justify the sale of the 3850 mass storage system simply by pointing to the reduction in the number of operators required to mount and dismount the tape drives. Also, the reduction in the number of librarians and clerks needed to handle the thousands of tape reels represents another example of IBM's gaining a larger share of the user's total DP budget.

We see this trend of putting more people-oriented functions into hardware growing rapidly in the early 1980 period. Thus, statistics which profile the DP users' requirements for highly trained personnel may be overstated.

The use of line managers, with their business knowledge and experience as DP analysts, provides another largely untapped source of technical management personnel. The establishment of a wider selection and higher quality curricula in the universities should also be possible.

Finally, a substantial improvement in the use of high-level languages and problem-oriented languages in future system architectures, aided by microcode accelerators and other functional and performance enhancements, should ease the personnel shortage problem.

No one can doubt that Logical Machine Corp.'s Adam, in concept if not in fact, heralds a new day in man-machine involvements which will lay RPG, Algol, Cobol, PL/I, Fortran and the others to rest — and, with these, many user problems.

Lecht is the author of four previous books on computer-related matters: The Programmer's Fortran II and IV, The Programmer's Algol, The Programmer's PL/I *and* The Management of Computer Programming Projects.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.

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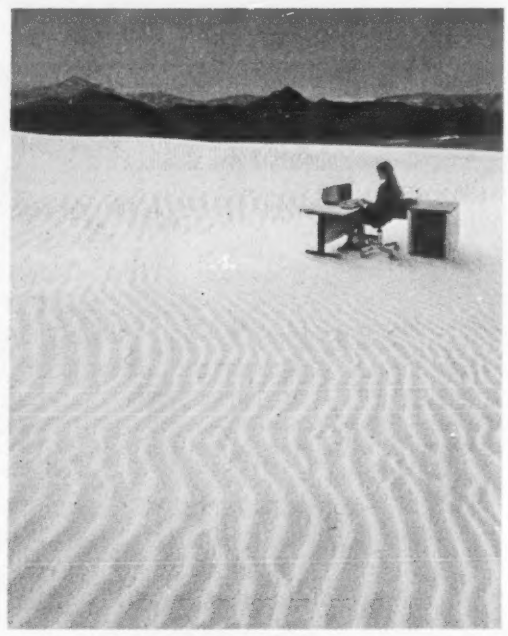

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'Minis Surpass All Standard Definitions' : Auerbach

By Esther Surden
Of the CW Staff

PHILADELPHIA — Varying degrees of support, software capability and throughput distinguish minicomputers from mainframes and micros, according to Isaac Auerbach, president of Auerbach Publishers, Inc.

Keynoting the *Computerworld* Computer Caravan, Auerbach said several of the criteria formerly used to define minicomputers have now become muddied and that "during the last several years minicomputers have surpassed all standard definitions set for them."

Many of those definitions have been based on price, the power of the system and the selection of peripherals available for them, he explained.

Price has been the most volatile factor in the mini arena. Until recently, there has been a "polite separation" between the prices of minis and mainframes, but micros have forced minimakers to reduce their prices in the last few years.

Power Considered

Computer power also was a criterion used in the minicomputer definition. "It was commonly expected it would be slower than the mainframe," but now it is possible to build a mini system with power that formerly was only available at the high end of the spectrum, he noted.

In addition, peripherals that at one time were only available for mainframes are now available on minis. "It used to be that only the best peripherals . . . were available for the mainframe," Auerbach said. So peripheral capability, price and computer power can no longer be used to distinguish the mini from the maxi, he noted.

Other factors, however, can be used to draw a definition, he stated. Support services, for example, vary according to the price of a system. With mainframes, support services are usually bundled, he indicated. "Extra cost for the service you want is one of the ground rules for minis," he said.

Service Risk

Microcomputers also feature poor service, he said. "When you buy a micro today, you pay your money and take your chance," he said.

In the software area, minis still have less software capability than mainframes, and micros have still less.

Throughput — defined as the time it takes for a given system to complete a job or a given job mix — is not as great on minis. However, since minis don't usually try to replace mainframes, they don't need to have their throughput capabilities.

So there is a distinction between minis, micros and mainframes when one considers software, support and throughput, Auerbach noted.

Mini Environments

Minis can be used in two separate environments, an iterative environment, in which the programs doing the jobs are never in a steady state, and a fixed environment, in which the jobs are the same from day to day or week to week.

The iterative environment is what Auerbach called a visible market. In this capacity minis will take active roles in doing jobs mainframes cannot do effectively. Minis are at home in relieving the mainframe of many jobs, he said.

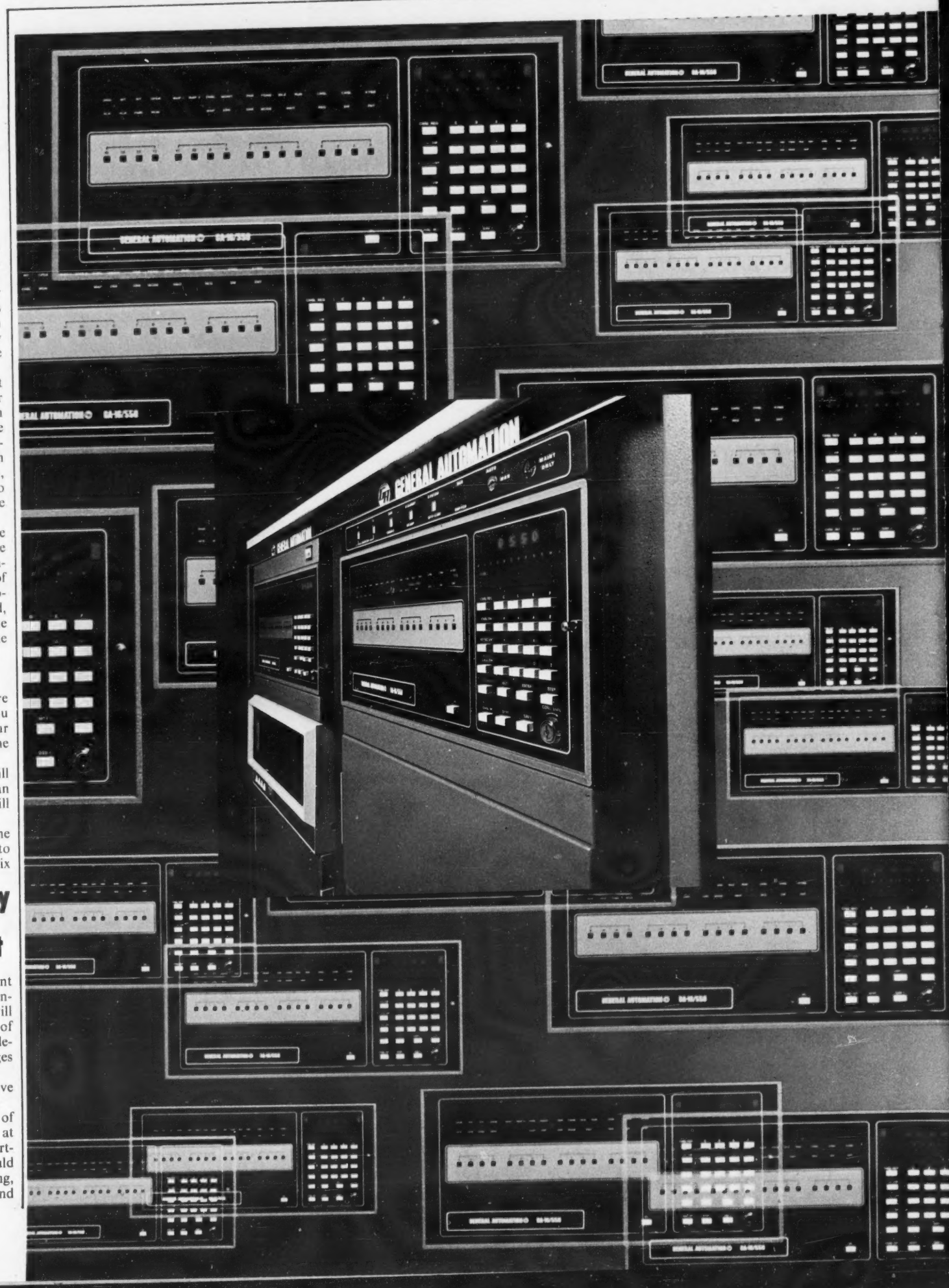
Minis are also at home in distributed networks as remote stand-alone units or as communications execution nodes. The future will bring minis more into the business arena as well, Auerbach said.

Minis are used in the invisible environment as communications controllers performing code conversion and error correction type functions or in such areas as production control and turnkey numerical control. In fact, "one may not know if the intelligence belongs to a mini- or a micro-based system," he noted.

New Computer Classes

Over the next few years today's three classes of computers will fade into three new broad classes — personal computers, dedicated or invisible systems and supercomputers, he predicted.

Within 30 years individuals will have personal computers that will be able to perform most of the DP functions they will need, and when the personal computer's capacity is exceeded, users will be able to access supercomputers with giant data bases. They will access these super computers by means of a cable that every homeowner will have attached to his home, Auerbach predicted.



Fourth Inventory Of Colleges Set

ROLLA, Mo. — Under a grant from the National Science Foundation, Dr. John W. Hamblen will conduct the fourth inventory of computer activities and related degree programs in U.S. colleges and universities.

Schools should expect to receive their questionnaires this month.

Hamblen, who is chairman of the University of Missouri at Rolla computer science department, indicated the survey would cover expenditures, staffing, hardware utilization, courses and degree programs.

Not a Question of Hardware

Debaters Agree: Today's Revolution Focusing on User

By Esther Surden
Of the CW Staff

NEW HAVEN, Conn. — The revolution taking place in DP is not really focused on hardware — it's focused on the user. It's a revolution that is making DP responsive to the user, according to participants in what was advertised to be a mini vs. maxi debate here recently.

In essence, it was the great debate that wasn't.

Mini vs. maxi isn't the issue, Robert Weissman, president and chief executive officer of National CSS, Inc. explained, speaking for what was to be the maxi side of the argument.

"What is developing is a new generation of data management hardware, married to software of a new kind, married to communication," he said. The trend toward minicomputers is just an indication of this development.

John Hughes, vice-president of DP for First National Citibank and an enthusiastic supporter of minicomputers, agreed. "The revolution is not really hardware-based," he said.

Citibank does not care what kind of hardware it uses as long as it does the job. "Our intent is to eventually have a chip in a desk with some bubble memory that can store all of the processes necessary to support that particular position," he stated.

Hughes described Citibank's switch to minicomputers to explain why he's biased toward the small systems.

Bypassing the System

With the former large centralized DP department, things had gotten so bad that a simple request for information had to go through a dozen people and took 10 days to complete. "If I didn't have 10 days, I would write it off to a tape and take it to a service bureau," he told the group.

"Now the output is produced and available (for a simple request) in about a minute and a half," he said.

Management had made it clear to each corporate profit center that each was expected to squeeze out a 15% annual growth. With the DP situation, this was very difficult to achieve, he said.

There were many problems with the centralized control, Hughes related. Users were forced to homogenize their requirements to fit the job mix, and system lead time was out of proportion to the business needs. "The users were an unhappy lot," he said.

Since minicomputers have all the capabilities of large mainframes at a tenth of the cost, there's really very little reason not to go with them, he said. "How much time have you spent trying to pare your programs down to fit a partition?" he asked. With minis, this is unnecessary, he said.

Users who want to try minis but are facing a reluctant management should "obtain permission to buy several intelligent terminals and actually buy micro systems or small minis," Hughes suggested. Those users seriously considering the mini should begin to build some staff expertise in the small systems and be on the lookout for a likely user test site within the organization.

Get the mainframe programmers involved, he urged. "When we started on our security processing application [the mainframe programmers] couldn't imagine working with minis, but by rubbing our people up against mini specialists," they became interested in the small systems, he said.

The bank has realized savings from the mini experiment and now has about 250 of the small systems.

According to Weissman, the question is not whether minis are the right hardware; it is wrong to start with the hardware. Users should "start with the information problem and use the system to solve the problem. If everyone bought minis the world would not suddenly be wonderful tomorrow," he stated.

"I believe the mini is just a transitional step," he added. "In the next three to five years we will see the development of data management hardware designed specifically for the job." After all, he said, "the mini user doesn't really want to talk in Fortran or Cobol." The user wants to have a system that is easy to use and will manage his data, he said.

"Pray for the DP manager who doesn't recognize what the revolution really is," he added. Even though minis and maxis are doing the same thing the Eniac did only faster, there is no reason to expect they will always do the same thing in the same way. "The new generation will do the job differently," he predicted.

"The economics of hardware are destroying Grosch's law," he added, but there is a counter trend that says data will migrate upwards.

Hughes agreed that data will migrate because there must be some management control of data.

Editorial

Another Spaced-Out Suit?

The partnership that formed Satellite Business Systems (SBS) is troubling the Justice Department. Specifically, the Antitrust Division is concerned about potential anticompetitive aspects of the SBS operation [CW, June 6].

There is reason to believe that both Comsat General Corp. and IBM could have launched their own satellite venture without outside help. But when two corporations of this size band together, there is always the possibility the end result will be a lessening of competition.

The two partners took an unlikely third party — Aetna — into their venture, perhaps to allay the fears of those that saw a monopoly in the making. As a leading nationwide insurance company, Aetna can make good use of the SBS service for its corporate communications needs. So the triumvirate has a built-in customer.

IBM also will exploit the service for its own use and, in this regard, most of SBS' initial experimental operations will be related to the in-house IBM communications network.

In approving the SBS plan, the Federal Communications Commission looked mainly at economic questions relating to the ability to finance this massive network. The commission feels its regulatory oversight functions will forestall any market abuses.

But the Justice Department apparently feels a clear and present danger may exist that requires more than the limited police powers of a regulatory agency. For this reason, the trustbusters are asking some piercing questions about the participants in the partnership.

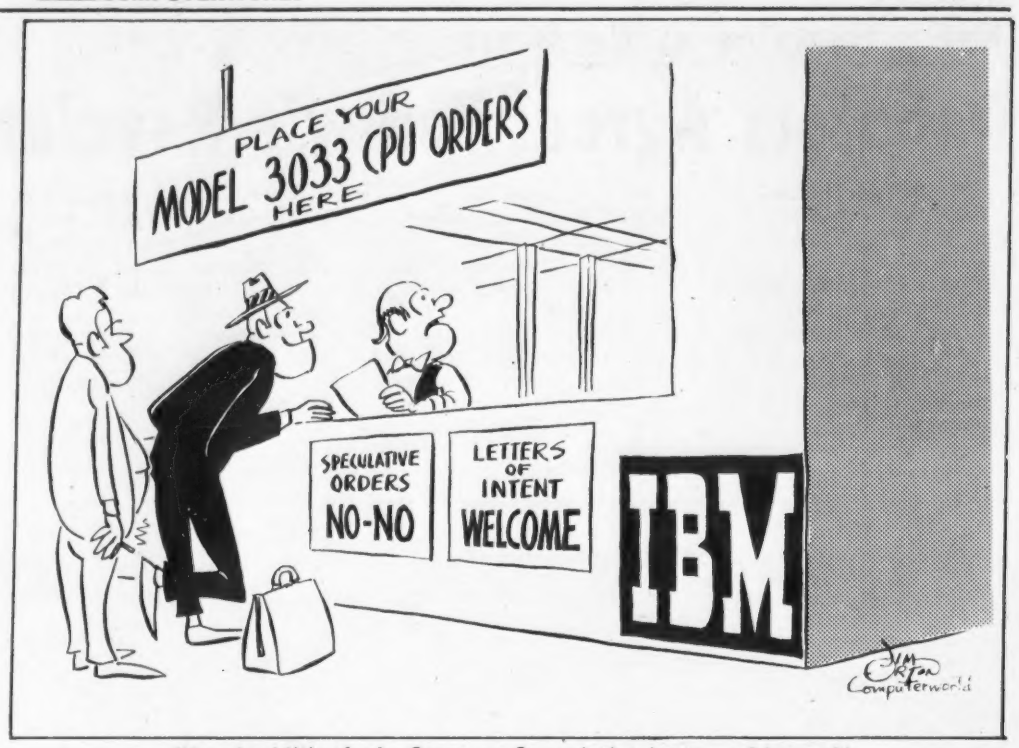
The Civil Investigative Demands made on the SBS partners may turn up evidence that will lead to an antitrust proceeding. There will be no definite answer on this until Justice experts digest the documents that are due at the end of this month.

But some nagging questions come to mind. Justice is already embroiled in two major antitrust proceedings which attempt to prove that IBM and AT&T operated in anticompetitive ways. Both these companies have been in business for many years, and Justice is drawing on their business records to make its case.

If SBS turns into an antitrust suit, there will be no track record to fall back on. The case will have to rely on the motives and intent of the partners as Justice perceives them.

All this is not to say that SBS is without antitrust implications. The satellite venture carries with it a very frightening potential for communications dominance.

The Justice Department is looking after the public interest by asking for SBS details now. But it should guard against shooting itself into an endless orbit by launching another suit that will float in legal space for years to come.



'Hey Joe! What's the Story on Speculative Letters of Intent?'

Letters to the Editor

Nothing Should Ever Stand in Way Of the Right to Free Expression

In his letter, ["Another Software Saga Episode," CW, May 23], Roy N. Freed stated "it probably isn't illegal, let alone unconstitutional" for the Tennessee legislature to tax as tangible property precisely the same software that the Tennessee Supreme Court ruled to be intangible property.

That position, if sustained, would appear to upset the balance of power between the divisions, because it allows the legislative division to fly in the face of any decision by any court through the arbitrary redefinition of words.

If such lawmaking is merely "ill-advised or downright stupid," as Freed advanced, let them plead their own case. As an industry, we have a right to expect government to know the law.

I happen to be one of those "computerniks" so named by Freed [CW, May 9] who was illegally assessed some $45,000 in alleged back software taxes under the guise of legality. Estimates by lawyers to properly defend against my assessment exceeded $50,000.

In my case the monetary gap between right and remedy exceeded my available resources, and I did the only thing I could do. I brought a rule challenge myself under the prevailing Florida Administrative Procedure Act.

Just as nothing should ever remove a party's right to legal counsel, nothing should ever impair a party's right to freedom of expression or his right to present his facts to government without having to retain an attorney.

Robert M. Sherin
President

Nova Computing Services, Inc.
Miama, Fla.

Certification Urged for Handicapped

On behalf of the Institute for Certification of Computer Professionals (ICCP) I'm responding to the article "DP Industry Doing Its Share for Handicapped?" [CW, May 16].

ICCP urges the handicapped to seek certification and provides sites to meet their special needs at our own expense.

In 1977, we had three special requests from handicapped individuals and consequently had three special testing sites in Denver, Tallahassee, Fla., and Columbia, S.C.

I'm pleased with such coverage and I hope we in DP can always do more for the handicapped.

J.J. Martin
Treasurer

Institute for Certification of Computer Professionals
Chicago, Ill.

Honeywell's '76 Revenues Rose 9%

I would like to correct any misconceptions that might have arisen from the article entitled "DP Industry Fares Well in Ranks of Fortune 500," [CW, May 16], which stated Honeywell's revenues decreased 9.6% in 1976 compared with the previous year. The report was based on information contained in the Fortune 500 listing.

As Honeywell reported on Jan. 31, and as was published in *Computerworld* Feb. 14, Honeywell's total revenues in 1976 rose 9% over restated 1975 revenues. Restatement was necessary to reflect Honeywell's reduced ownership in CII-Honeywell Bull, the French computer company formed in 1976 by the merger of Honeywell Bull and Compagnie Internationale pour l'Informatique (CII).

Because of this reduced ownership and, in conformity with generally accepted accounting principles, Honeywell as a minority owner with a 47% interest does not include revenue from CII-Honeywell Bull in its consolidated summary of income, as was done previously with a 66% interest in Honeywell Bull.

James H. Grenell
Vice-president and Controller

Honeywell, Inc.
Minneapolis, Minn.

Data Past

Five Years Ago
June 14, 1972

WASHINGTON, D.C. — A committee was formed by the Department of Health, Education and Welfare (HEW) to investigate the use of the Social Security number as an "identifier" of individuals. David Martin, executive director of the committee, said the body was formed to "develop an analysis of the potential harmful consequences" of automated personal data systems.

— — —

DETROIT — Burroughs Corp. demonstrated its B1700 small-scale business system featuring variable micrologic, word lengths variable down to one bit, high-level programming through micrologic interpreters rather than conventional compilers, virtual memory techniques and solid-state memory.

Eight Years Ago
June 18, 1969

NEW YORK — Programmatics failed to persuade Judge Edward C. McLean that it would be irreparably damaged if IBM were permitted to continue to distribute the 483 DOS sort. As a result, the company lost its bid for a temporary injunction preventing further distribution.

— — —

OAKLAND, Calif. — Two Ampex large-core memories for the IBM 360 were linked to two Kaiser 360/50 computers. They operated at a cycle time of 4.5 microsec instead of the 8 microsec of the equivalent IBM unit.

Take Note, Donn Parker

Any Fool Can Become a Winner in the Game of Ethics

By Joseph T. Rigo
Special to Computerworld

The nice thing about ethics is that any fool can be a winner. It takes no skill, experience or intelligence to be ethically superior to all the other kids on the block.

After all, who among us can measure up to someone else's own personal code of ethics?

I mention this because Donn Parker seems to have found a new way to get his hands on my tax money. These days, he is into ethics, courtesy of the National Science Foundation.

Donn works at the Stanford Research Institute in California. He is best known for his studies of computer fraud. That work was also financed largely by tax money. Donn has probably made more money out of the Equity Funding scandal than any of the people who took part in it.

Easier Than Ethics

I think Donn will find that fraud is easy compared with ethics. Fraud is part of criminal law, and there are years of court decisions to define the rules precisely.

With ethics, the rules must inevitably remain vague.

Everyone agrees ethics are a good thing. The discussion bogs down when you try to get specific; then each participant's personality takes over.

A mild-mannered person pours out a long list of standards to govern the conduct of high-pressure salesmen. The salesmen want rules about people who are less than completely open and direct. On television, I have seen Mafia gangsters get outraged at the way corporate executives take advantage of tax loopholes.

Organizations also have pet interests. For example, the Association for Computing Machinery (ACM) is academically oriented. Accordingly, its code maintains that members are ethically bound to "maintain a program of continuing education."

With organizations, the inability to agree on specific points always leads to a "conduct unbecoming" clause in one form or another. It is impossible to know in advance what you can be clobbered for. A committee will discuss your offense, and may the Lord have mercy on your soul.

For 'Them,' Not 'Us'

The other big problem with ethics is that the rules are really meant for "them" — not "us."

Donn's studies so far come down very heavily on working programmers, analysts, managers and writers in DP shops. Donn's expertise in this area is not readily apparent.

On the other hand, Donn must know a great deal about people in computer science research. He has extensive inside knowledge of how they get money from the government and how they spend it.

Reader Commentary

Donn could propose a great code of ethics for research scientists. Of course, it wouldn't be any better than any other code, but the project might uncover some great war stories for the front page of *Computerworld*.

ACM has the same problem. Its code contains a lot of references to people who design and sell systems. There are no direct references to the research scientists and college professors who are a major part of ACM's membership.

In older professions, the codes of ethics have been worked over for so long that they cover the right people, but it is questionable whether the codes work any better.

The ethics forces in the American Bar Association had nothing to say about Richard Nixon while he was still president. It was only after he was safely caged and muzzled in San Clemente — and could no longer appoint federal judges — that the armies of morality decided he was not good enough to be a lawyer.

Perhaps our professional associations could be more diligent in policing the ethics of the industry. I think, though, they might take a look at their own actions first.

For example, the ACM council spends several thousand dollars each year promoting the Certificate in Data Processing. It strongly urges working programmers to lay out the $100 or so that is needed for the CDP tests, travel and associated expenses.

Yet, at last count, not a single council member had seen fit to acquire a CDP.

I asked a former ACM president about this. If I may paraphrase her response, she said, "The CDP is for 'them' — not 'us.' "

Meanwhile, news accounts say Donn used my tax money to fly 30 of his friends from around the world to San Francisco for a one-day workshop on ethics for Cobol programmers.

Now I ask you, is that ethical?

Rigo is president of Sysdoc, Inc. in New York.

Computer-Generated Forms Should Be Clear, Legible

The Taylor Report
By
Alan Taylor, CDP

Some programmers of the Commonwealth of Massachusetts realize there is more than one side to computer form design. In designing their earnings statement (Figure 1), they have ingeniously used this knowledge to do various potentially useful things — such as inviting all state employees to slide presentations on "Thinking About Retirement" without using any more computer forms than usual.

The Commonwealth has the seven-line invitation printed on the back of the employees' earning statements, which certainly seems like an example of economy. No forms, no mailing — it seems a good idea to piggyback it.

Frankly, however, when you review the printout it seems the ingenuity would more properly have gone into taking a reasonable look at the front side and redesigning the system to maintain a little more service to state employees than it currently does. Certainly, as the form stands, it is more likely to get Robert Q. Crane, treasurer and receiver general, into trouble wih his colleagues at the attorney general's office for misleading labeling than it is to achieve any plaudits from the state employees.

No Subtotals

The troubles start when an employee tries to check out whether he is getting the correct pay. True, a figure for gross pay is given — and so is a figure for net pay. So are five or more deductions — taxes, retirement, insurance and the unexplained "SALADV."

People really don't carry mental computers around with them to add these deductions. Without a subtotal they are not easily able to check the Crane arithmetic. Since the computer has the answer, it is only reasonable that if seven lines of printing can be used to offer a slide presentation, then five characters could be used to show a sub-total.

No such luck. The employees are left to get out paper and pencils and make the calculations themselves, thus wasting their time and sometimes becoming frustrated. Of course, it's unlikely that many objections will reach the treasurer's office, because obviously anyone can see "That's the way the computer does it."

Spaces Lend Clarity

That also may be the reason for the ridiculous use of SALADV. This stands for "salary advances," although it looks more as if the treasurer has gone slangy and is talking about some kind of lettuce instead of dollars.

The people who "designed" the abbreviation don't seem to realize that spaces are characters too — and some of the most informative ones. Nor have they seen that the form's design, poor as it is, apparently allows for seven-char. labels (see INS-BAS for "basic insurance" on the left-hand panel of the voluntary deductions area in Figure 1).

There is no reason why the words "salary" and "advance" could not be divided into "SAL ADV" or, to avoid a space, "SAL-ADV." Such a break would improve the legibility, even if the joining of the two words did not create the block "SALAD."

Under the present circumstances, where there is space and when the words are lost in a confusing abbreviation, there is no excuse for letting it stay as it is. Hopefully, someone will soon change it.

Root of the Problem

However, such changes — totaling the deductions and giving them clearer labels — only reach the surface of the real problem of the person trying to use this earnings statement to find out whether his pay is correct.

The fact is, the form is *not* an earnings statement, but it is a take-home pay calculation, showing where money the worker is not getting is going and saying nothing at all about the makeup of his earnings.

Figure 2 shows in some detail just what happens when the computers took over in this case. This is a precomputer earnings statement from 1976, combined with a deductions statement. It shows the makeup of the amount earned, including regular pay and various sorts of extra pay.

Provides Code

This breakdown, which was superceded by the uninformative computer-produced statement we have just examined, even provides codes for explaining what the extra pay is about.

It is not as though the Commonwealth workers don't need explanations of their earnings, either. It is quite possible for various contract and previously disregarded earnings to be credited retrospectively without notice to the employee. The receiver can easily not realize what the break-up is unless it is itemized separately from regular overtime earned during the period, for example.

Left Wondering

Normal people, who don't carry an accounting department in their heads, are left wondering as to whether these other payments have been correctly credited. Again, they are at least as inclined to blame the computer for being so uncooperative in its output, as they are to think of blaming the treasurer. In fact, Crane is to blame for putting up with such unnecessary failure to provide workers with the information the computer certainly has (and which the form has more than enough room to provide) even without giving up the ingenuity of the freebie printrun giving that seven-line invitation.

I am sure everyone — including the computer community — would be happy to see a decent, informative earnings statement. It wouldn't take much effort at all.

Commonwealth of Massachusetts
EMPLOYEE EARNINGS STATEMENT **No. P 016925**

EMPLOYEE NAME	GROSS PAY	FEDERAL TAX	STATE TAX	RETIREMENT
	832 34	108 56	34 15	41 04

VOLUNTARY DEDUCTIONS

INS-BAS 4.43 SALADV 225.00

ROBERT Q. CRANE

TREASURER
AND
RECEIVER GENERAL

PERIOD ENDING	DEPT	REFERENCE NUMBER	NET PAY
03 25 77			419 10

Figure 1. This form is used as an earnings statement. However, it actually itemizes deductions, not earnings.

STATEMENT OF EARNINGS AND DEDUCTIONS — MASSACHUSETTS CORRECTIONAL INSTITUTION, FRAMINGHAM

REGULAR PAY	CODE	EXTRA PAY	CODE	TOTAL EARNINGS	DEDUCTIONS: RETIREMENT	FED. TAX	ST. TAX	BONDS	MAINT.	OTHER	MISC. AND ADJUSTMENT	CHECK NUMBER

DETACH BEFORE CASHING AND RETAIN THIS STATEMENT FOR YOUR RECORDS

EXPLANATION OF OTHER DEDUCTIONS
1ST WEEK - GROUP INS.
2ND WEEK - OPTIONAL INS.
3RD WEEK - UNION DUES
4TH WEEK - OTHER

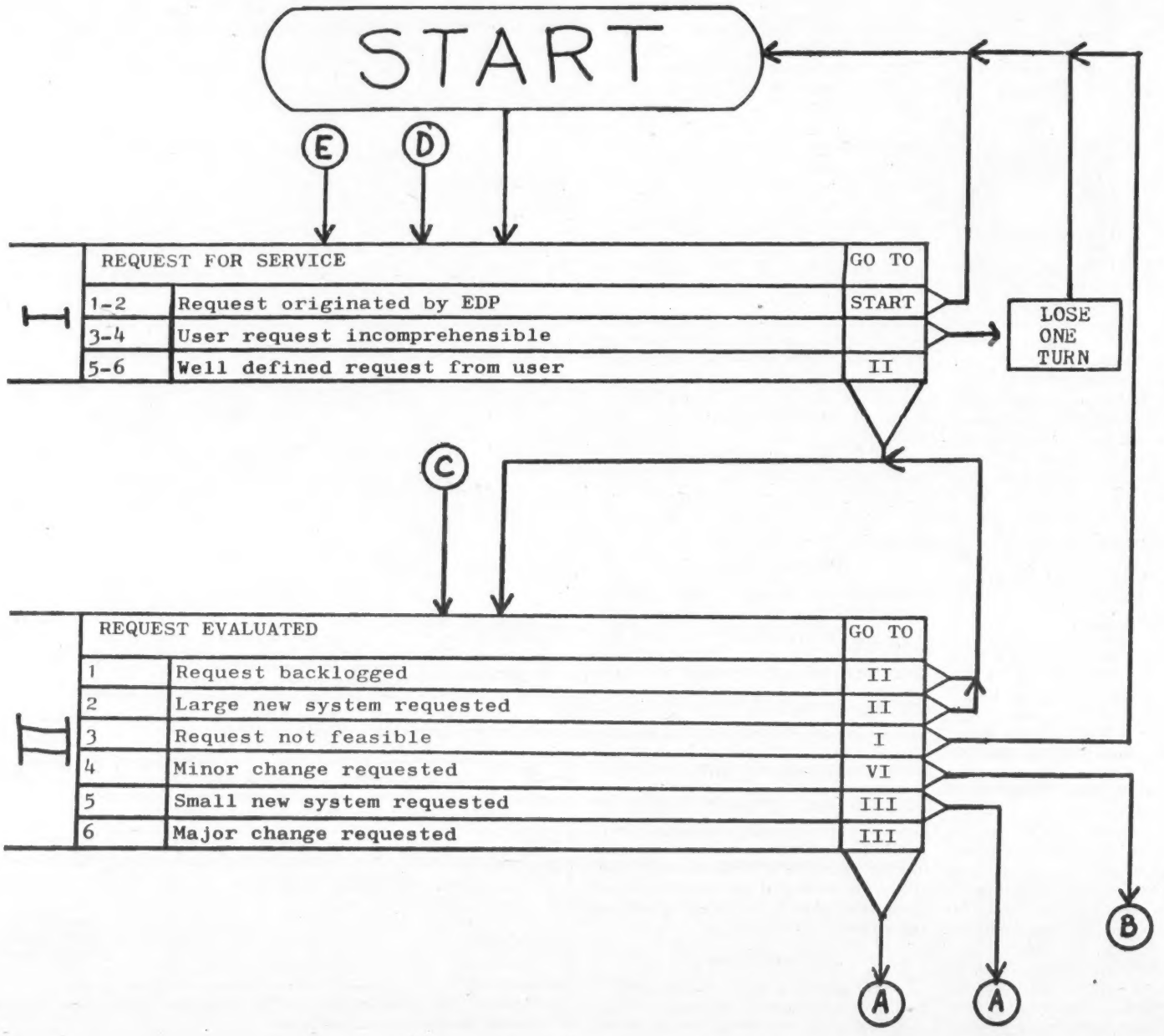
Figure 2. The precomputer (1976) form was a real earnings statement. No wonder computers get a bad name.

THE PROJECT GAME

BY LOUIS FRIED

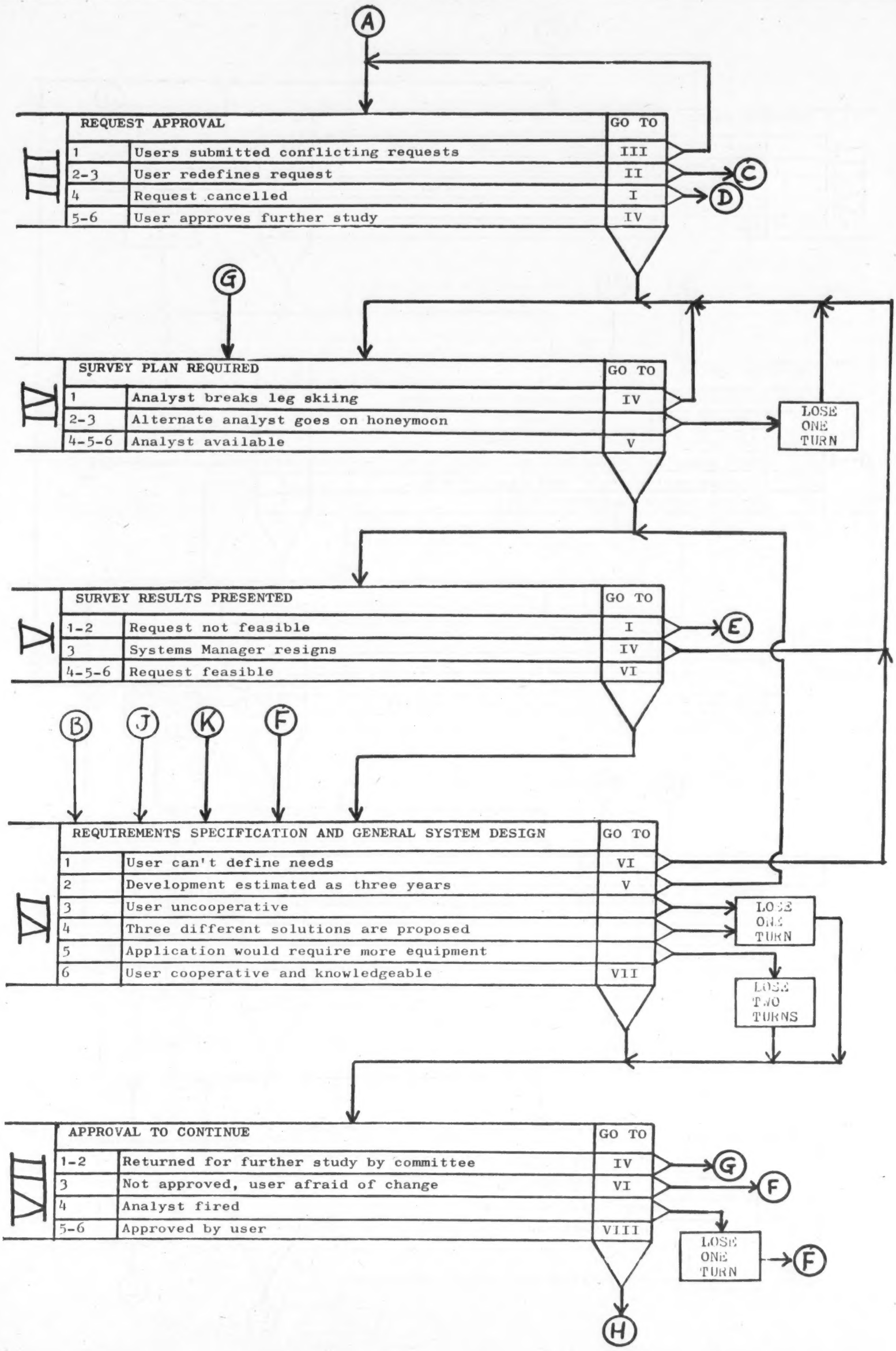
RULES

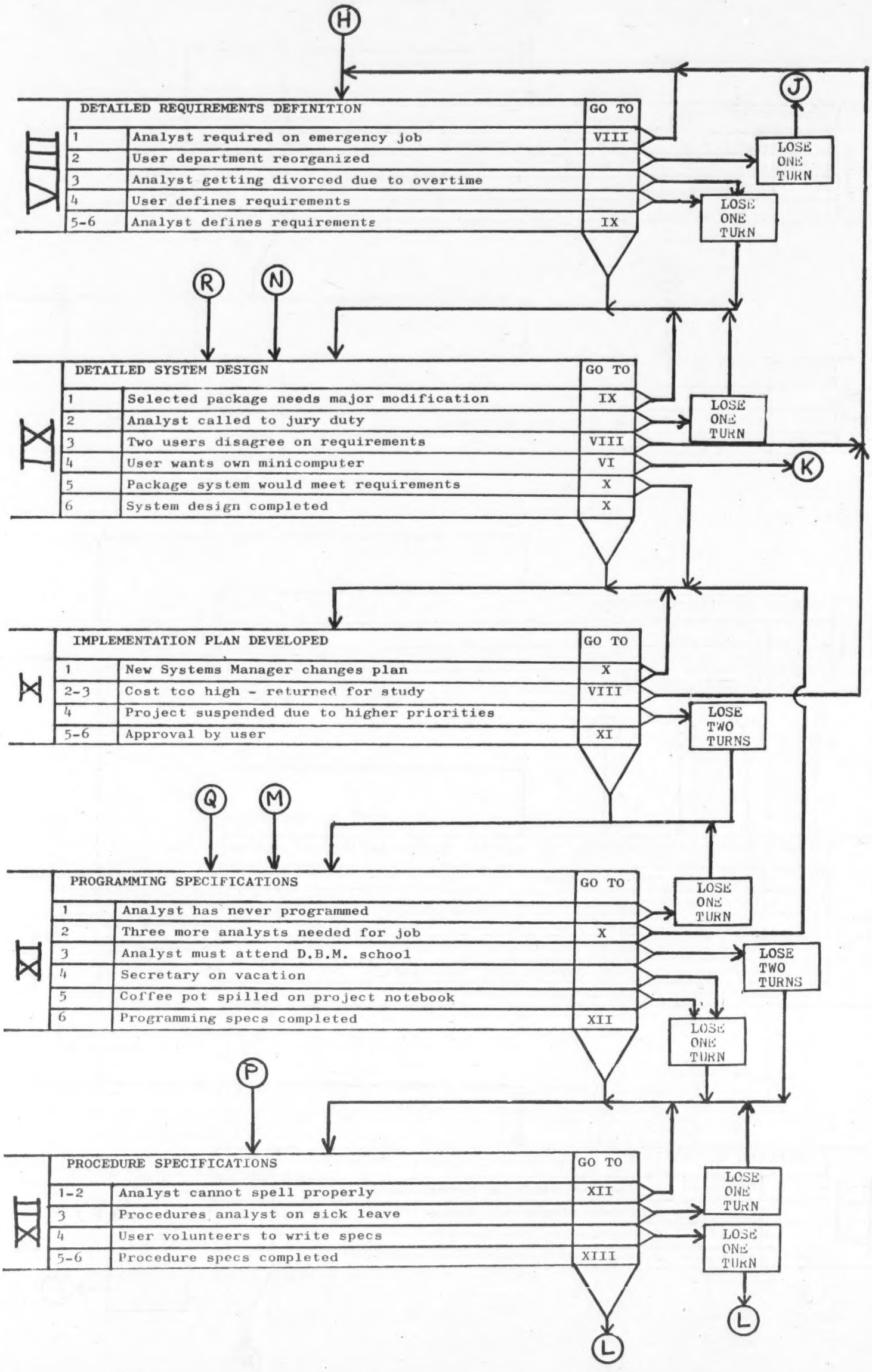
1. Place any kind of token (chess piece, coin, used coding pencil) on START.
2. To determine moves, use one die (half a pair of dice), a deck of cards with all sevens through kings removed, or six coins in a paper cup.
3. Throw die, cut deck, or shake up and throw coins (count only heads), in turn. The highest score starts first.
4. Starting player throws die (or etc.) and follows instructions and arrows indicated by matching number in left column of each block on flowchart.
5. Player arriving at EOJ first is the winner. Winner gets to keep all tokens.

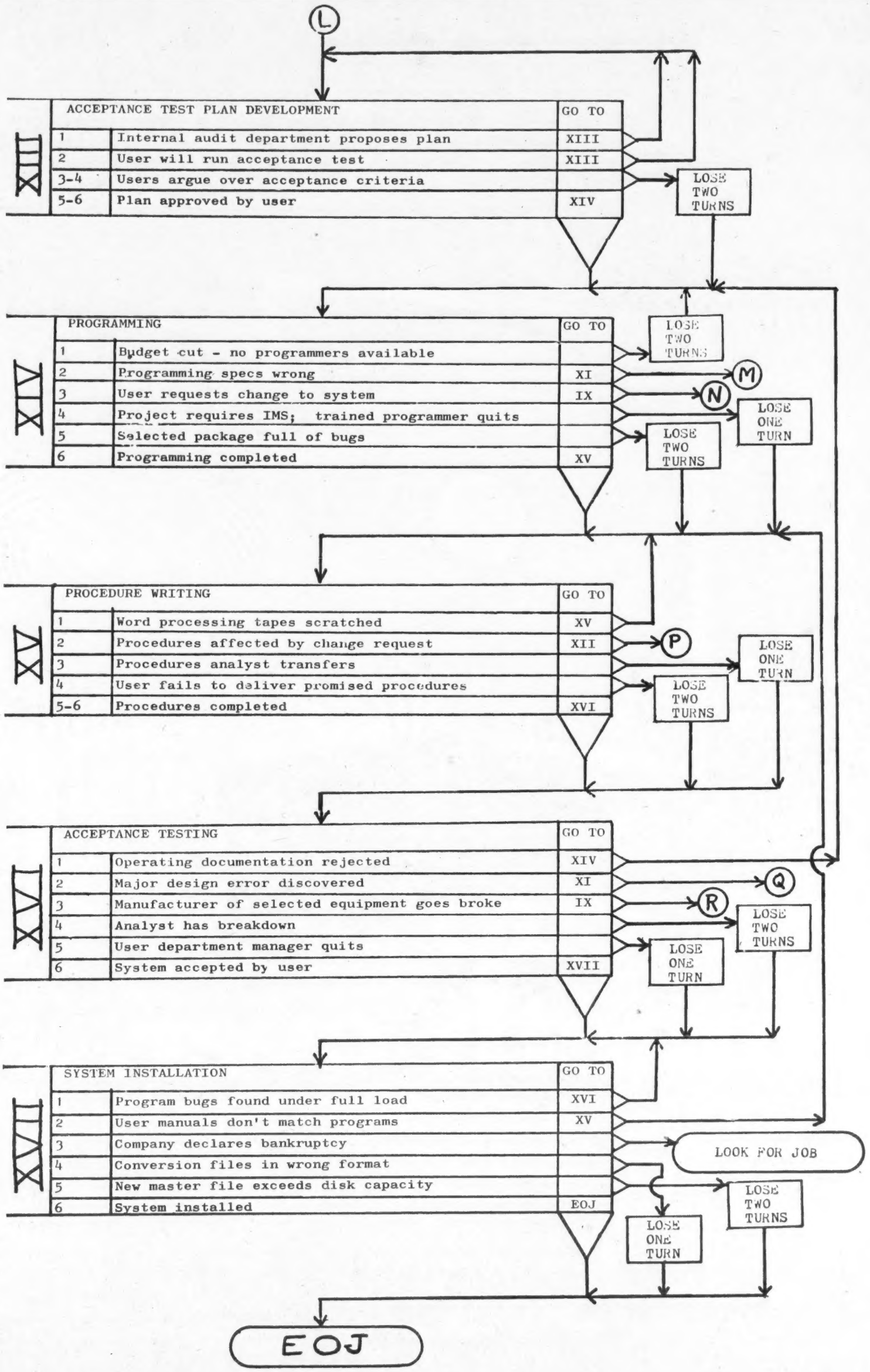


REQUEST FOR SERVICE		GO TO
1-2	Request originated by EDP	START
3-4	User request incomprehensible	
5-6	Well defined request from user	II

REQUEST EVALUATED		GO TO
1	Request backlogged	II
2	Large new system requested	II
3	Request not feasible	I
4	Minor change requested	VI
5	Small new system requested	III
6	Major change requested	III


A
REQUEST APPROVAL
GO TO
1 Users submitted conflicting requests III
2-3 User redefines request II
4 Request cancelled I
5-6 User approves further study IV
C
D
G
SURVEY PLAN REQUIRED
GO TO
1 Analyst breaks leg skiing IV
2-3 Alternate analyst goes on honeymoon
4-5-6 Analyst available V
LOSE ONE TURN
SURVEY RESULTS PRESENTED
GO TO
1-2 Request not feasible I
3 Systems Manager resigns IV
4-5-6 Request feasible VI
E
B
J
K
F
REQUIREMENTS SPECIFICATION AND GENERAL SYSTEM DESIGN
GO TO
1 User can't define needs VI
2 Development estimated as three years V
3 User uncooperative
4 Three different solutions are proposed
5 Application would require more equipment
6 User cooperative and knowledgeable VII
LOSE ONE TURN
LOSE TWO TURNS
APPROVAL TO CONTINUE
GO TO
1-2 Returned for further study by committee IV
3 Not approved, user afraid of change VI
4 Analyst fired
5-6 Approved by user VIII
G
F
LOSE ONE TURN
F
H


H
DETAILED REQUIREMENTS DEFINITION
GO TO
1 Analyst required on emergency job VIII
2 User department reorganized
3 Analyst getting divorced due to overtime
4 User defines requirements
5-6 Analyst defines requirements IX
J
LOSE ONE TURN
LOSE ONE TURN
R
N
DETAILED SYSTEM DESIGN
GO TO
1 Selected package needs major modification IX
2 Analyst called to jury duty
3 Two users disagree on requirements VIII
4 User wants own minicomputer VI
5 Package system would meet requirements X
6 System design completed X
LOSE ONE TURN
K
IMPLEMENTATION PLAN DEVELOPED
GO TO
1 New Systems Manager changes plan X
2-3 Cost too high - returned for study VIII
4 Project suspended due to higher priorities
5-6 Approval by user XI
LOSE TWO TURNS
Q
M
PROGRAMMING SPECIFICATIONS
GO TO
1 Analyst has never programmed
2 Three more analysts needed for job X
3 Analyst must attend D.B.M. school
4 Secretary on vacation
5 Coffee pot spilled on project notebook
6 Programming specs completed XII
LOSE ONE TURN
LOSE TWO TURNS
LOSE ONE TURN
P
PROCEDURE SPECIFICATIONS
GO TO
1-2 Analyst cannot spell properly XII
3 Procedures analyst on sick leave
4 User volunteers to write specs
5-6 Procedure specs completed XIII
LOSE ONE TURN
LOSE ONE TURN
L
L


L
XIII
ACCEPTANCE TEST PLAN DEVELOPMENT
GO TO
1 Internal audit department proposes plan XIII
2 User will run acceptance test XIII
3-4 Users argue over acceptance criteria
5-6 Plan approved by user XIV
LOSE TWO TURNS
XIV
PROGRAMMING
GO TO
1 Budget cut - no programmers available
2 Programming specs wrong XI
3 User requests change to system IX
4 Project requires IMS; trained programmer quits
5 Selected package full of bugs
6 Programming completed XV
LOSE TWO TURNS
M
N
LOSE ONE TURN
LOSE TWO TURNS
XV
PROCEDURE WRITING
GO TO
1 Word processing tapes scratched XV
2 Procedures affected by change request XII
3 Procedures analyst transfers
4 User fails to deliver promised procedures
5-6 Procedures completed XVI
P
LOSE ONE TURN
LOSE TWO TURNS
ACCEPTANCE TESTING
GO TO
1 Operating documentation rejected XIV
2 Major design error discovered XI
3 Manufacturer of selected equipment goes broke IX
4 Analyst has breakdown
5 User department manager quits
6 System accepted by user XVII
Q
R
LOSE TWO TURNS
LOSE ONE TURN
SYSTEM INSTALLATION
GO TO
1 Program bugs found under full load XVI
2 User manuals don't match programs XV
3 Company declares bankruptcy
4 Conversion files in wrong format
5 New master file exceeds disk capacity
6 System installed EOJ
LOOK FOR JOB
LOSE TWO TURNS
LOSE ONE TURN
EOJ

Our cup runneth over...

Yesterday: One computer tape from Wabash, Indiana.

Today: A total line of magnetic media products From 300 U.S. and Canadian locations. With fast, professional assistance. From the finest distributor organization in the industry.

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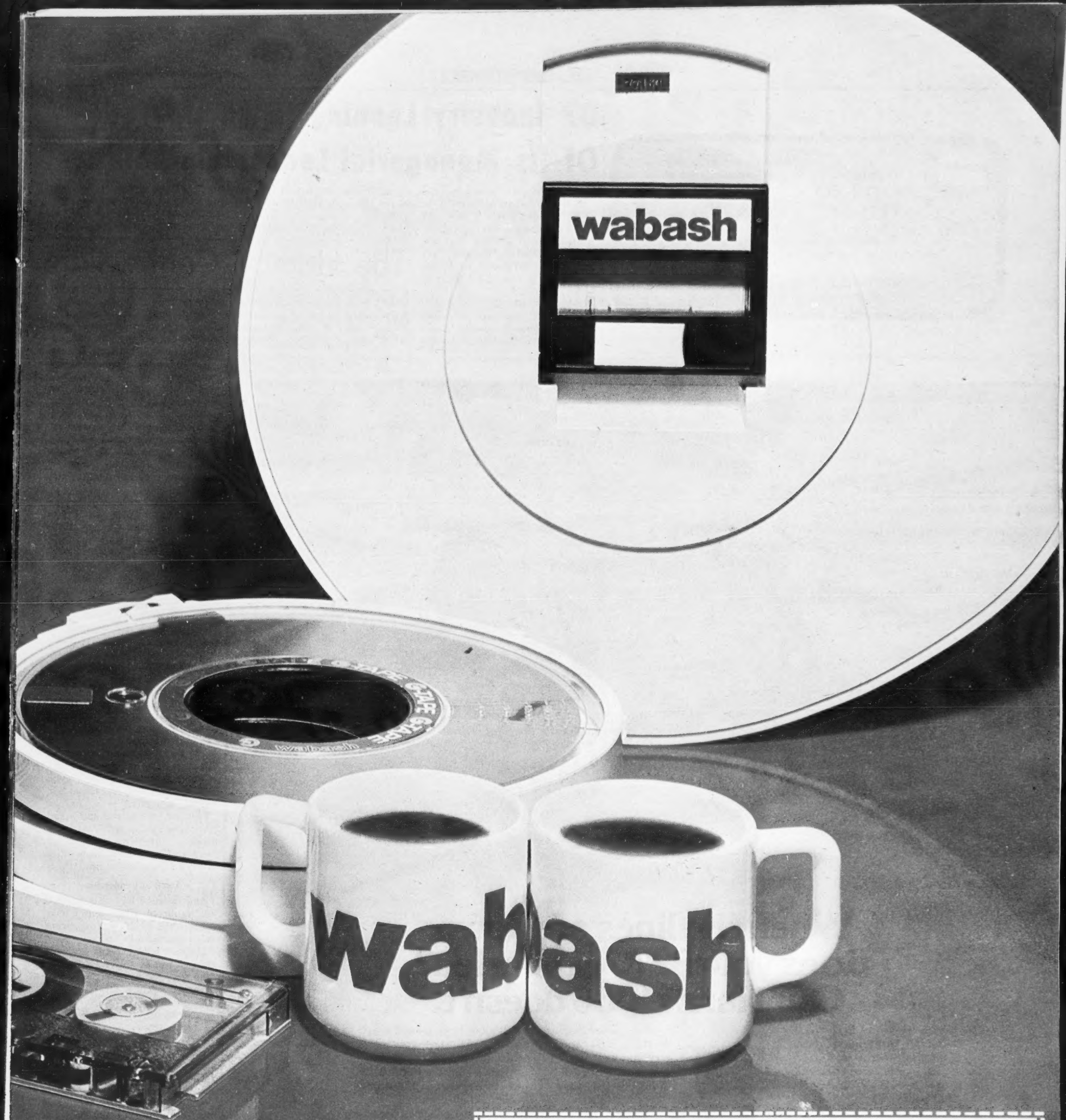
Clip the coupon or give us a call. Your local Wabash rep will make some interesting comparisons for you in the space of a coffee break. He'll even bring the coffee cups.

For all of you who are already Wabash magnetic media product users, your Wabash representative wants to share a coffee break with you too. To thank you—and make a toast—to all of you whose confidence has made us what we are.

SKOAL!



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Wabash Tape Corporation
2700 Des Plaines Ave.
Tel. (312) 298-8585
Telex. 9106511800

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Wabash Tape Canada Ltd.
3135 Universal Drive
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Essex CM3 4TB U.K.
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Telex. 947347

wabash

Wabash Tape Corporation
Wabash Tower Huntley, Illinois 60142

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- ☐ Quadronix Computer Tape
- ☐ Primus Computer Tape
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- ☐ Magnetic Cards
- ☐ Disk Products

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DP Industry Leaning to an Upgrade Of Its Managerial Leadership Abilities

By Jack Stone
Special to Computerworld

"Raise your hand if you feel your computer center generally provides valid systems that are truly beneficial for the end users and were developed and implemented at acceptable levels of cost and efficiency."

Suppose that you — a DP manager or supervisor attending your national hardware user's conference — heard this statement during the opening remarks of one of the lecturers. How would you respond?

Let me relate what happened when I made the statement during my presentation on DP personnel development at the National NCR Users Conference (Nucon) April. (I have used this comment to begin most of my speeches during this year's lecture tour since it quickly raises audience energy levels.)

The Human Connection

I guesstimate about 350 DP managers and supervisors were crowded into the meeting room at the St. Louis Stouffers Towers that morning but less than a dozen raised their hands.

Well, although my turn at the podium began after the morning coffee break, I had to ask more questions to confirm the response and get some more audience reaction. So, I went on. "Well, that's about the percentage response that I have seen in other audiences.

"What's the problem? Do you have hardware constraints?" No more than eight put up their hands. "Programming difficulties?" Possibly 15 hands showed up. "Cost limitations?" Just a few votes.

Then I asked if the reason for poor systems was attributed to personnel problems, identifying particular categories of personnel in succession: operators, programmers, analysts, users, managers, and executives.

To each category, the show of hands ranged only from perhaps 15 to 30. A quick addition indicated many did not respond; I stated that to the audience.

I pointed to one individual and said: "You didn't vote. Why not?" "Because our problems in developing acceptable systems come from human failures across the board!" he replied.

I picked up his lead and asked "Are your system problems really people problems in all categories?" It looked to me that nearly 350 hands went up.

Lack of Leadership

And this poll merely confirmed the results of other polls I have taken while on the lecture circuit. What are the polls saying?

They are telling us the aspect of the business worrying DP managers the most is the lack of managerial leadership — in their subordinate supervisors, in their senior executives and, of course, in themselves.

As you may recall, I have written a number of columns about the needs for developing the leadership qualities of computer center managers. The incident at Nucon served well to drive home the seriousness of the problem, but it also vividly showed me the intense interest on the part of DP managers that has developed during recent months.

It seems that many organizations are starting to explore ways by which the human side of the computing systems business can be addressed.

In addition to the NCR users group, other major organizations comprised of both the academician and the practitioner are organizing presentations on leadership and human communications: The 1977 National Computer Conference will have its panel on "Humanistic Perspec-

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DP Industry Leaning Toward Upgrade of Leadership

(Continued from Page 66)

tives on Computer Center Management," the Data Processing Management Association will have a presentation on "Motivation of DP Personnel" at Info/-Expo '77 and the Society for Management Information Systems is sponsoring a lecture on "Human Engineering" at their National Conference on Computer Systems Productivity this month. (Without trying to appear immodest, I have to admit I am heading each of these events.)

Advancing Interest Illustrated

But perhaps even more significant are the advancing interests of many DP groups at the local levels. I have singled out one of many letters I have received on the subject to illustrate this growth.

The letter contained a copy of the "President's Message" to the members of the DPMA Schuylkill Valley Chapter in Reading, Pa. It was originally written for their March 1977 newsletter and is presented here in slightly edited form:

"The area of 'how am I progressing in my company?' seems to be of utmost importance to all of us. I believe that in many of our companies, we are not recognized as managers the way our counterparts in the accounting, traffic and credit departments are viewed.

"Recognizing the fact many of us in the DP field have caused this dilemma, perhaps we have to project another image.

"But before we can correct some of the problems we have created, let's examine a few causes. Many of us are guilty of subjecting our users to the "I know something you don't" attitude that is sometimes fostered by the technical knowledge we must have to perform our jobs.

"No one enjoys the feeling of being inferior, but I know of many managers and programmer/-analysts that delight in throwing around the latest buzzwords in front of users who have no idea what is being said.

"Another reason top management often views us as less than acceptable upper-management material is because some of us refuse to let go of the technical duties we performed successfully on our way up the management ranks. We must relinquish these duties to subordinates, raise our sights and broaden our viewpoints beyond the confines of the computer room.

"I believe we DP managers are really in a great position to move into top management slots. After all, we are part technician and part businessman; let us use that to our advantage.

"One thing we must do is educate ourselves in the areas of management, communications skills and general business operations. We must avail ourselves of seminars, college courses and reading materials to enhance our skills.

"We probably understand the inner workings of our companies as well as anyone in the corporate structure. If we are smart, we would parlay our knowledge of the business and sharpen our leadership skills to form complete package of a competent, responsible manager.

"We cannot be satisfied with an ego trip by being the magician with the computer on his side, coming to the rescue of top management.

"In closing, I would like to point out that top management today is becoming more aware of the crucial resources found in the corporate DP facility.

"We have a major responsibility to our companies, our staffs and ourselves to develop our abilities, provide 'egoless leadership' and move into the upper tier of the corporation.

"So put down your coding sheets and attend DPMA's regional conferences; they may help you prepare yourself for another step up the corporate ladder."

Clifford L. Bergman
Luden's Quality Candies

Readers are invited to write about their experiences in developing managerial leadership. Send letters to Stone, Suite 222, 2233 Wisconsin Ave. N.W., Washington D.C. 20007.

Letter to The Editor

Business DP Programs Need to Share Ideas

The article entitled "University Producing Grads 'Pretrained' in Business DP" [CW, May 2] quoted Irving Sherman, chairman of the Information Systems Management Program at the State University of New York at Buffalo, as saying, "Our program deals with business problems and their solutions and applications and is probably the only one of its kind."

This seems to show there is a serious lack of communication among those who administer these types of programs.

We feel there is a need to exchange ideas and review curricula, and we would be pleased to host a symposium to bring together faculty and administrators of business DP four-year degree programs.

Gayla Stewart
Computer Specialist
Washington University
St. Louis, Mo.

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If you missed seeing our new STC 8350 at its New York introduction—or the operating unit we displayed in the Computer Caravan—stop by and see us at the NCC Show, Booth 2020. You can also see our new STC 1900—a high density tape drive for minicomputers. Plus our complete line of high density disk and tape subsystems.

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No Conflicts, No Empires

Service Bureau, Mini Split Manufacturer's Workload

SANTA ANA, Calif. — In an area near the production manager's office in its plant here, the Data Tech Division of Penril Corp. has a minicomputer.

But that's for manufacturing operations. All of the financial work is done by a large outside computer service organization.

"The rationale is classically simple," Controller William E. Dooling said. "The service company can do a better job more dependably and within a tighter time frame for considerably less than half the cost of an in-house computer center.

"In addition, by blending the best available internal and external DP services, our division derives a substantial plus, even if that can't always be reflected below the bottom line.

"There are no conflicts between the needs of accounting and manufacturing. This means, in essence, that there's no time wasted with politicking or empire building. Priorities are always clearly drawn: Get the job done for the company as a whole," Dooling said.

Each Penril division is independent with respect to financial and accounting controls. For the Data Tech Division, the information needed to maintain strict control of labor and component costs, as well as inventory levels, is contained in the comprehensive series of computer reports supplied by Automatic Data Processing, Inc. (ADP).

One segment of this is the weekly payroll for the 100 employees of the division, all of whom are hourly rated, including executives and administrative staff.

The payroll processing produces all of the customary registers and journals, but of equal importance, the individual time card data is also retained by ADP for end-of-the-month melding with inventory withdrawals accumulated by the division's minicomputer.

How System Works

Each of the 150 jobs in process at any given time is assigned a code number. When an employee works on that job, he notes its code and his hours on his time card.

Simultaneously, the minicomputer is used to record inventory withdrawals by job code. After ADP has been supplied with this data, it can produce a payroll distribution and summary of materials used by job, along with the plus or minus variations from standard costs for each.

ADP is also processing Data Tech's 1,000 to 1,200 monthly accounts payable vouchers.

Each week, the service provides Data Tech with a list of all new bills that have reported, along with any previously unpaid ones. The preprinted page has a strip at the side so the accounts payable supervisor can check off those which are to be paid.

An expense distribution report is generated showing the date of each bill, the amount, the vendor number, the vendor's invoice number and the account distribution for the general ledger. Again, as with payroll, the information is retained in the ADP files.

At the end of the month, the company receives a consolidated accounts payable expense summary and each item is automatically entered into the general ledger.

Some years ago, computer service bureaus acquired something of a bad reputation. Some were small, underfinanced and severely limited in the processing they could do, Dooling said.

But "none of these drawbacks prevails with ADP," he added. "The service it provides has been able to handle all of our requirements. The company provided Data Tech with specially designed time cards, for example, which are tailored to our needs.

"And when needed for end-of-the-month closing of the general ledger, payroll turnaround can be produced in less than 24 hours.

"Our cost for the comprehensive processing service is less than the lease cost of a modest-size computer. If we attempted to do the work in-house, we'd have to spend about double the hardware outlay for personnel," he said.

With Five-Module System

Basic/Four Enhances Business Programs

IRVINE, Calif. — Five general accounting modules are included in the Comprehensive Business System update (CBS II) introduced by Basic/Four Corp. for use on all of its small business systems.

The order processing module includes order entry and one- or two-step billing, inventory control and sales analysis, according to a spokesman.

The accounts receivable module — which can be integrated with order entry and the general ledger module — supports aging of outstanding balances, posting of cash receipts, preparation of statements and a "complete customer status inquiry" facility, the spokesman said.

The purchase order entry subsystem includes back-order status inquiry and cash requirement planning logic, he added. The general ledger module provides month-end reports in addition to supporting a flexible chart of accounts, journal entries and preparation of income statements.

Module V, the payroll program, accommodates hourly and salaried personnel including multiple deductions. The subsystem produces labor distribution data and state and federal tax and Social Security reports, the spokesman noted.

Some of the features provided by CBS II include support for multiple pricing of company products, for multiple inventory locations and for the processing of multiple companies in one pass of the system. The sales analysis subsystem includes an optional 24-month history, he added.

Available as options are an Automated Documentor system for maintaining "complete and accurate" but unspecified system documentation and a file management system (FMS) that provides data file and program security and operator activity reports.

The FMS permits flexible control over multiuser contention, maintains file definitions and controls system execution, the spokesman explained.

CBS II operates on any Basic/-Four system using the BBII language as long as it has a 5M-character disk storage capacity, a 165 line/min printer and a CRT terminal to input data.

The cost of CBS II has yet to be determined, the spokesman indicated. Basic/Four can be reached through P.O. Box C19550, Irvine, Calif. 92713.

Prime Packages Software for Its 500

FRAMINGHAM, Mass. — Prime Computer, Inc. has packaged the software for its recently introduced Prime 500 system [CW, Feb. 7] so users can acquire whichever of five levels of support seems most appropriate to their needs, according to a vendor spokesman.

The lowest level package, Level 510, provides general-purpose computational time-sharing support software while the highest level package, Level 590, provides data base management, Cobol and RPG-II in addition to all the features of the lower levels, he said.

Specifically, Level 510 includes the Primos V operating system, Fortran IV, Basic, a Macro Assembler and Prime's Multiple Index Data Access Method (Midas). Editors, a file manager, utilities, debuggers and sort and runoff facilities are also part of this $15,000 package.

Users with remote job entry requirements can purchase the Level 530 package, which includes all the Level 510 software and Prime's IBM 2780 and Hasp workstation emulators. The Level 530 package costs $16,000.

The Level 550 software package adds Prime's Forms Management System (Forms) designed for easy screen formatting and data input programming, to the Level 530 package. Level 550 costs $17,600.

Uses with data base management requirements using Fortran can buy the Level 570 package, which includes Level 550 software and Prime's Codasyl-compliant data base management system. Level 570 is priced at $31,900.

Prime customers who need interactive business DP capabilities in their time-sharing systems can buy the Level 590 package, which adds Cobol and RPG-II to Level 570. The Level 590 package costs $38,800.

Prime is at 145 Pennsylvania Ave., Framingham, Mass. 01701.

'Accounting IV' Ledger System Updated

RIVER EDGE, N.J. — Release 8.0 of the Accounting IV general ledger and financial reporting system from Informatics, Inc. offers improved file security and application capabilities to users, IBM, Honeywell and Univac users, according to a spokesman.

Accounting IV is a ledger system designed to interface with a direct cost and flexible budgeting system which will accept entries on marketing plans, variable manufacturing budget allowances, standard costs and fixed budgets in tandem with actual entries to the ledger, Informatics said.

The updated package introduces a segmented processing feature which allows multiple divisions to be treated as completely separate entities for general ledger processing and financial reporting, the spokesman added.

Beyond that, a procedural report writer feature provides the accountant with a user-oriented tool for performing calculations and printing the results anywhere on the financial statement. "Rabbit reports," another feature, allows the accountant to reproduce standard financial statements for multiple divisions, he stated.

Accounting IV is written in Cobol and PL/I. It can be used with IBM 360/370 DOS, OS and VS systems and Univac and Honeywell CPUs, requires 100K main memory and costs between $25,000 and $39,000.

Informatic's Accounting IV Division is at 65 Rt. 4, River Edge, N.J. 07661.

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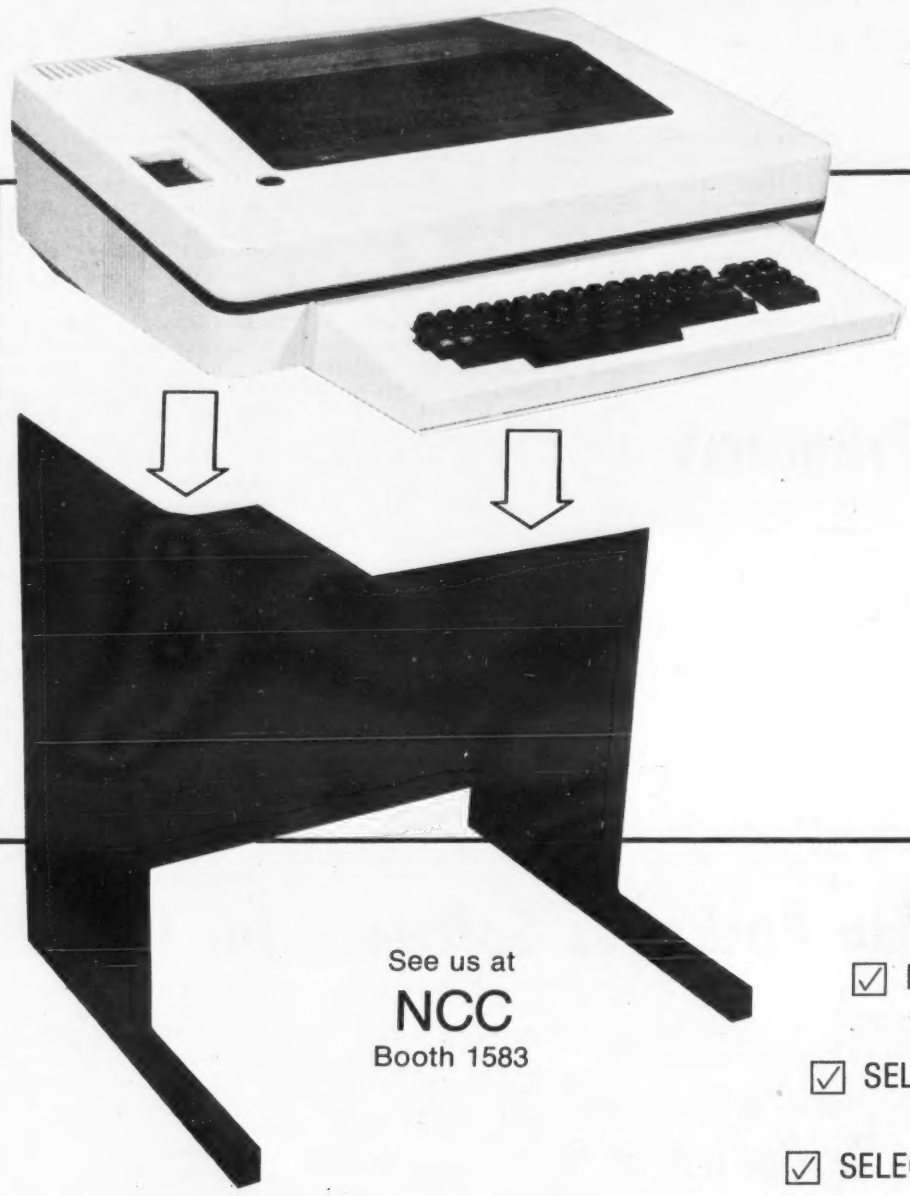

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For the I-8000s

NCR Adds On-Line Applications

DAYTON, Ohio — NCR Corp. has announced a series of interactive application packages for use with the interactive systems in its 8000 series.

Most of the software is tailored to specific target users, including health care organizations, manufacturers, wholesalers and distributors, moving and storage companies, schools and government agencies, according to a spokesman.

But one of the packages — the Interactive General Accounting System — provides accounts receivable, payroll, accounts payable and general ledger applications for general business use, he noted.

All of the software is written in Cobol '74 and is designed in modules.

The Interactive Health Care Informatin System includes modules for inpatient/outpatient processing, patient billing, accounts receivable, accounts payable, payroll and general ledger accounting. An optional module produces the records required for treatment of patients under various federal health programs, the spokesman added.

The Interactive Manufacturing System module covers such areas as order processing/sales analysis, inventory control and planned receipts, according to NCR. The Interactive Wholesale/Distribution System includes order processing, inventory control, accounts receivable, accounts payable, payroll and general ledger, the spokesman said.

The system for moving and storage firms provides accounts payable, payroll and order processing support. The Scholars package for schools is a carryover from previously available software and includes student scheduling, grade reporting, attendance, test scoring and analysis and academic history.

Prices vary from module to module but can be illustrated by the health care modules. Inpatient processing costs $1,350 plus $30/mo, while the receivables module costs $1,200 plus $30/mo and the general ledger has an initial fee of $800 and $15/mo.

The general accounting system modules fall into the same pattern. The payroll module costs $1,400 plus $45/mo; the payables, $650 plus $15/mo; and the general ledger, $650 plus $15/mo, the spokesman said.

Package Assigns DOS/VS Devices During Run Time

GREAT NECK, N.Y. — Although the assignment or release of an I/O device into or from an executing partition is "impossible" with IBM's DOS/VS, it can be done quite simply with the Detour package from Sota Computer Systems, a spokesman claimed.

Conventionally, all assignments of I/O devices into a partition must take place at the start of a job or step and remain until the end of the job or step. To do otherwise would normally require a drastic change in the OPEN/-CLOSE macros or some specially written BAL coding to release the devices ahead of time, he said.

Not Brought Down

With Detour, however, it isn't necessary to bring down a partition to change its device assignments. "With one simple command," for example, an operator who knows a tape drive is needed only at the beginning of a long-running job may release it whenever it is in fact available, the spokesman said.

Conversely, he may assign a device into an active job at any time during its execution, as might be necessary in an on-line application, the spokesman suggested.

The package can be used in any IBM 370 DOS/VS system and is available for an introductory cost of $750. The cost is expected to rise to $1,000 sometime later, Sota said from Station Plaza East, Great Neck, N.Y. 11022.

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When They're Done Carefully

Operating System Changes Can Be Creative and Useful

By Russell Martin
Special to Computerworld

Contrary to Dr. Ruth Davis's recent statements [CW, April 25], operating system software changes can be both creative and productive. Moreover, they will not necessarily lead to the proliferation of incompatible operating systems.

Even if all operating system software were unbundled, the mainframe manufacturers could still set the standard by establishing the software interfaces, forcing competitors to produce systems which are compatible to the end user. Only in this way will the user community be best served.

But let me back my basic contention that operating system changes can be good with an illustration.

In 1976, Air Canada converted its reservation system from a 262K-word Univac 1108 using Level 21 Exec 8 software to a 393K-word Univac 1110 using Level 32 Exec 8 software.

The Level 21 executive contained many functional additions and was extensively optimized from 1968 through 1974. But the 1108 configuration could not be expanded beyond 262K words and the maximum volume capability was approximately 85,000 transaction/hour.

The conversion required 20 man-years' effort in the "exec" area over a period of two years. Approximately 15 man-years were devoted to the development of functional equivalence and five man-years to optimization.

Functional equivalence was essential to avoid changes in more than 800 application programs. Optimization was required to utilize the potential of the 1110.

Optimization Effort

The functional and optimization efforts were performed jointly throughout 1975, but 1976 was devoted almost exclusively to performance improvement.

The effect of the optimization is illustrated by the following volume projections, using statistics obtained from both hardware and software monitoring under live conditions:

March 1976	85k/hour
April 1976	105k/hour
May 1976	110k/hour
September 1976	125k/hour
October 1976	135k/hour
November 1976	145k/hour
January 1977	150k/hour

The exec optimization was concentrated on the high-use areas of the operating system, viz. main memory management, CPU dispatching, I/O paths for set up and completion, on-line program scheduling, etc. These areas were selected using extensive statistics from both hardware and locally developed software monitoring.

Specifically, the optimization effort consisted of the thorough application of such techniques as reduction in the complexity of high-use algorithms, reduction in the use of queues to pass control from one area of the exec to another and reduction in priority switching for both user programs and exec elements.

Other techniques involved redevelopment of the on-line program scheduler to improve program selection under conditions of saturation volume, enhancements to memory management to ensure multiple, simultaneous use of the instruction areas by high-use reentrant programs and improved use of temporary buffers and reduction in buffer clearing where possible.

Avoided Save/Restore

We made efficient use of both the exec and user register sets to avoid unnecessary save/restore calls and calls to the CPU dispatcher. We also worked for reduction in the number of I/O requests for transaction program loading and exec nonresident segment loads through the use of dynamically adjusted memory priorities based on the relative use counters.

Rounding out our general optimization effort, we used register-independent subroutines to avoid use of the Executive Request instruction in all high-use exec code and improved instruction sequences through all high-use code to minimize instruction execution time.

Our optimization was restricted to the use of such techniques as would apply to any Exec 8 environment.

Noticeable Increases

The increase in on-line volume capability was measured, but no accurate statistics were maintained for the improvement in batch performance.

Many of the performance changes would, however, affect batch and on-line programs similarly and a substantial increase in batch performance was noticed.

Current operating procedures permit simultaneous execution of both batch and on-line programs. Sufficient batch throughput can be obtained during the prime shift to meet the requirements of approximately 50 programmers for maintenance and development work.

The back shift is utilized primarily for dedicated testing, data base maintenance and data base backup. Thus most programmers are able to perform their duties during normal working hours.

Threefold Increase

The major optimization effort required only five man-years over a one-year period. This was very cost-effective for a threefold increase in volume capability when spread over a mainframe lifetime of five to 10 years.

In fact, the benefits of optimization have been so significant, exec development is still continuing.

The argument over the desirability of operating system software changes will continue at least until the large mainframe manufacturers hide their operating systems in hardware.

Hopefully, all the software will be unbundled before that occurs so the free enterprise system will have the opportunity to ensure the software is as efficient as competition can generate.

Martin is president of Optimal Systems Ltd., Oakville, Ontario, Canada. He participated in the Air Canada software development effort during 1975 and 1976 as a consultant.

Datapoints Target of 'Edit-Pak'

WASHINGTON, D.C. — Edit-Pak from The Wyatt Co. is a data-editing system designed for the Datapoint series of minicomputers utilizing Databus and Datashare.

Included in Edit-Pak are a sequential file editor for 80-character records and a direct-access editor for files that are in Edit-Pak libraries.

The Wyatt package also includes several utility programs that are command files to create, reorganize and renumber Edit-Pak libraries, he noted. These are invoked from the system console; the editor programs can be activated from the console or from a Datashare terminal.

Edit-Pak supports the capability of making global changes throughout a number of files as well as a number of additional commands to increase the speed and simplify use of the software, a spokesman said.

The library support features in-place updating so there is no rewriting of the file; it also features data security said to be better than that of the Datapoint editor.

The Edit-Pak security facility means a system crash can only affect the current record and not the entire file, the spokesman explained.

The performance of Edit-Pak is such that editing time for a 1,000-record file can be cut by 98% compared with Datapoint's software, he claimed.

Edit-Pak is currently designed for Datapoint 5500 or larger systems utilizing Datashare with or without a partitioned supervisor. A version of the package for the Datapoint 2200 should be available in July, Wyatt said.

The package is available for purchase for $500 from Wyatt's Employee Communications Division, 1050 17th St., N.W., Washington, D.C. 20036.

User Options Extend Facilities Under Security System Upgrade

SAN FRANCISCO — Enhancements built into an updated version of the Data Access Security (DAS II) package include support for a password data set on shared direct-access storage devices, two-way support for IBM's Time Sharing Option (TSO) and protection of data sets by high-level indexes, according to the vendor, Tesseract Corp.

The software also includes a dynamic password interface for on-line systems and eight user options for extended control of access authorization, a spokesman noted. Tape handling and volume table of contents (Vtoc) protection have also been improved, he said.

DAS II is upward-compatible with its predecessor. It authorizes jobs, not users, to access protected data sets by building passwords from components of the JCL statements. Under this scheme, only the security officer knows the passwords, the spokesman explained.

The extended user options in DAS II give the security officer more precise and more flexible control through a free-form access protection language, Tesseract said. Authorization by a particular password can be restricted to certain hours of the day, to batch jobs or to TSO users only, the spokesman noted.

The restrictions can be applied to a limited number of attempts to use the system, to specific jobs, TSO users, programs or account numbers or to any combination of these possibilities, he continued.

Unlike DAS I, the update searches the password data set for an entry authorizing and restricting the requested access; DAS I gave the password to the IBM security module to perform the search.

DAS II is available now for OS/MFT and MVT and for SVS systems; support for MVS and VS1 is scheduled for later this year.

The update costs $8,195. DAS I, which currently supports all versions of the IBM operating system, is still available for $6,500. Tesseract can be reached through P.O. Box 7658, 101 Howard St., San Francisco, Calif. 94120.

Program Building Eased for Syfa User

IRVINE, Calif. — An interactive program development system that permits users to examine and debug programs while they are executing has been developed by Computer Automation for its Syfa network processing system.

The Probe package offers two modes of dynamic program diagnoses. In trace mode, program labels and values of user-selected variables are continuously printed, allowing the user to follow program execution, a spokesman explained.

In debug mode, the user can interact with Probe through a CRT terminal keyboard while the program is executing. As many as 90 user-picked variables can be examined an manipulated at one time and the user can transfer control within the program dynamically, he added.

Programs for Syfa systems are written in the Syfa Business-Oriented Language (Sybol), described as a high-level language specifically created for the on-line interactive network environment.

Probe is coded so it can be used "as-is" or tailored to unique user requirements. The basic Probe package is available free to all Syfa users, Computer Automation said from 18651 Von Karman, Irvine, Calif. 92713.

Insulation Thicknesses Figured by Free Package

MT. KISCO, N.Y. — The optimum economic thickness of industrial insulation in specific situations is determined by a package from the Thermal Insulation Manufacturer's Association (Tima).

In addition to determining the most economic thickness for insulation in such areas as piping, vessels, boilers, ovens, refrigerated enclosures and walls, the program can also calculate the cost of installed insulation, Tima said.

Developed by York Research, Inc. of Stamford, Conn., it also shows the annual heat and dollar savings, the value of energy saved over the estimated life of the proposed insulation and the insulation surface temperature, according to the spokesman.

The program, written in Fortran IV, can run in 16K words of memory on a Univac 1108 and is available free from the association at 7 Kirby Plaza, Mt. Kisco, N.Y. 10549.

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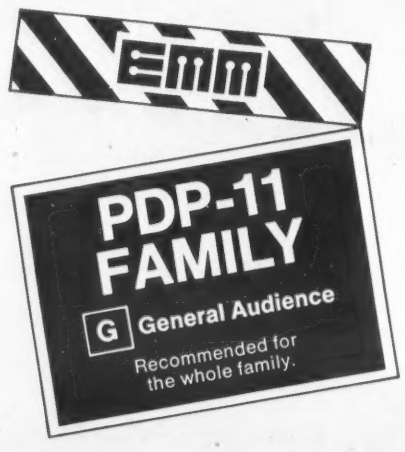

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Can Government 'Clout' Lead to DOD-1 Acceptance?

By Robert L. Glass
Special to Computerworld

WASHINGTON, D.C. — Can the clout that created Cobol gain acceptance for a new, general-purpose engineering applications language?

The Department of Defense thinks so. It is well into the process of defining just such a language, to be called DOD-1, and the current expectation is that the language will be rigorously defined and a test translator for it implemented by early 1979.

(It was the DOD which gave Cobol its shove toward widespread acceptability when it required Cobol compilers to be available for all computers procured for military inventory in the late 1950s.)

Groundwork for the new language, laid over the past couple of years, has included the following steps:

- Issuance of a DOD directive in April 1976 (number 5000-29) which, among other things, requires the use of a DOD-approved high order programming language (HOL) for all defense system software, unless it can be demonstrated that use of a HOL is either not cost-effective or not technically feasible. The goal is to force use of approved HOLs rather than assembly language or unusual HOLs.
- Iteration on a series of definitions of the requirements for a common DOD HOL. The requirements, reviewed by military, academic and industrial computer experts internationally, have progressed from the original "Strawman" proposal in early 1975, to a still-tentative "Woodenman" phase in August 1975, to a more orderly "Tinman" release in March 1976, and finally to a compact and stable definition in "Ironman," dated January 1977.
- Establishment of a list of allowable interim HOLs which may be used until DOD-1 is available. The list consists of CMS-2 and SPL-1 (Navy languages), Tacpol (an Army language), Jovial J3 and J73 (Air Force languages) and Cobol and Fortran. Each language on the list is to be assigned to a governmental control agent to prevent deviations from standard definitions.
- Signing of a contract within the next month for a definition of the language (guided and constrained by the "Ironman" requirements) and a pilot implementation.

Lt. Col. William A. Whitaker, Air Force officer in charge of the DOD-1 process, said the goal of DOD-1 is to take a more orderly approach to the $3 billion that DOD spends annually on computer software. Whitaker, who works at the Defense Advanced Research Projects Agency in the Pentagon, calls the advantages of HOL use "compelling."

A common DOD HOL, he said, will not only provide the traditionally well-known HOL advantages of reducing programming costs, increasing maintainability and providing some measure of application software portability, but it will also allow the development of associated modern language-dependent software support tools.

"A total programming environment . . . includes not just compilers and debugging aids, but text editors and interactive programming assistance, automatic testing facilities and proofs of correctness, extensive module libraries and even semiautomatic programming from specifications," he said, pointing out that currently "the average programmer's tool box is rather bare."

Non-Military Usage

Whitaker sees potential for the use of DOD-1 outside the military. "Its use in DOD and the provision of tools by the DOD would make it a popluar candidate for use elsewhere." This has not happened with military languages in the past, he said, because there were too many of them.

Goals of the new language, according to Whitaker, include reduction in life cycle software costs, transportability of application code, improving maintainability and reliability and the capability for extremely efficient compiled code.

It is the intent of the DOD that the new language also be modern in concept. The base language which will be focused upon in the development of the language specification will be either Pascal, PL/I or Algol 68, according to Whitaker. None of the languages on the interim list is sufficiently modern to be considered a good starting point. Thus DOD-1 is assured of being different from existing DOD languages.

Requirements in the "Ironman" specification include such advanced concepts as strong typing (the requirement for user declaration of data types, with compiler type consistency checking); encapsulated definitions (clusters of data with access restrictions); structured programming control structures (plus the ubiquitous GO TO); and parallel processing.

In addition, more traditional concepts such as the following will be provided: integer, scaled, fixed, float, character and Boolean data types; array (homogeneous) and record (heterogeneous) data aggregates; functions and procedures (including recursion); input/output; and exception handling (including specification of assertions which, when false, invoke an exception).

One surprising result of the DOD-1 program to date has been the commonality of requirements across application lines. Military user communities typically divide into such categories as avionics, weapons systems, guidance, command and control, communications, training simulators, etc. "It was impossible to single out different sets of requirements for different communities," Whitaker said. "Requirements solicited from these diverse users were identical."

The expectation is that as soon as DOD-1 becomes available, most languages on the interim list will be phased out. Existing code is, of course, exempted from both the interim list requirement and its phaseout, Whitaker noted.

Book Details Concepts Of Data Dictionaries

WELLESLEY, Mass. — *Data Dictionary Systems* by Dr. Henry C. Lefkovits contains a tutorial of the functions, benefits and use of the dictionary concept, then outlines system evaluation criteria.

This is followed by a detailed description of each of six systems: Arthur Andersen's Lexicon, Cincom System's Data Dictionary, University Computing's UCC Ten, MSP's Datamanager, Synergetic's Datacatalogue and IBM's data dictionary system.

The 340-page *Data Dictionary Systems* is available for $85 from QED Information Sciences, Inc., P.O. Box 181, 141 Linden St., Wellesley, Mass. 02181.

Interactive Financial Studies Backed on IBM Gear With 'PMS'

CAMBRIDGE, Mass. — With the Portfolio Management System (PMS) from Index Systems, Inc., investment managers can work directly with data stored in IBM 360/370 mainframes to analyze complex accounts, construct model portfolios or monitor the application of new investment strategies, according to a spokesman.

The managers' "conversations" with the computer are conducted through CRT terminals. With a unique command language, users are said to be able to filter and aggregate data into any desired format.

The package supports, for example, the listing of accounts by manager, current account holdings and value, recent trades or a specific security. It can provide individual portfolio reports or graphic plots that incorporate investment research data on the securities held, the spokesman noted.

Comparisons of price movements, earnings and other relevant data among selected issues as well as comparisons of account performance with leading market indexes are also available, he said. So are comparisons of portfolios having similar objectives and constraints to identify areas requiring action, he added.

The system is set up so it also provides top management with a means of measuring the performance of individual trust officers while it backs the individual investment manager in his work, Index said.

Currently implemented on IBM 360/370 systems under OS or OS/VS, PMS requires 380K of dedicated main memory, a communications front-end processor and a graphics output facility compatible with the Tektronix gear around which the system was developed.

Although written largely in PL/I, PMS is currently being evaluated for rewrite/-conversion to a minicomputer, the spokesman acknowledged.

The current IBM-oriented system has a base cost of $180,000, but "it wouldn't be unusual" for users to pay another $300,000 for modifications, he said from 1 Broadway, Cambridge, Mass. 02142.

'DCP' Builds Burroughs Nets

E. LANSING, Mich. — Systems Research, Inc.'s Data Communications Program (SRI/DCP) interfaces with Burroughs Network Definition Language (NDL) to provide functional control over an entire on-line system on any of the Burroughs Corp. medium-scale CPUs, according to a spokesman.

The program's basic functions include transaction-based message routing; application program control; terminal and line control; dynamic memory management; an application-independent five-level security system; and recovery procedures, he said.

In addition, SRI/DCP provides for the creation, maintenance and service of CRT screen displays, print file control, remote printing and remote SPO capabilities. The SRI software supplements NDL and replaces the Message Control System while easing the creation of application programs.

SRI/DCP includes the structures necessary for developing reentrant on-line application programs that are device- and communications-independent.

This application structure supplies all the on-line protocol and interface specifications necessary for communications with SRI/DCP. A user concentrates only on the development of the application logic and development time typically is sharply reduced.

By centralizing many of the system-related elements previously written into each user program, SRI/DCP requires approximately 15% to 20% more memory than the Burroughs-supplied software. But the application programs themselves are smaller, so the system can handle more concurrently, SRI said.

The package costs $12,500 and can be ordered from SRI at 241 E. Saginaw, E. Lansing, Mich. 48823.

'Access-1' Provides Structure Synthesis

ATHENS, Ga. — The Approximation Concepts Code for Efficient Structural Synthesis (Access-1) program from the Cosmic clearinghouse combines finite element techniques and mathematical programming methods, using approximation techniques, to form a minimum weight/optimum design capability for "a significant class" of structural synthesis programs, according to a Cosmic spokesman.

Attention is focused on two- and three-dimensional structural systems composed of isotropic materials that can be idealized under stress, triangular membrane and sheer panel elements.

Although the program was developed to test performance of various techniques of structural synthesis, he said it could be used to achieve efficient structural synthesis of minimum weight design.

Currently there are two versions of Access-1 available: one for IBM 360 users, the other for the Control Data Corp. 6600. Each is written in Fortran and distributed on magnetic tape for $1,100, with documentation also available for an additional $35.50.

The IBM version (cataloged as LAR-11994/CW) has run on a 360 with 380K bytes of memory available. The CDC version (LAR-12209) used approximately 250K (octal) 60-bit words, Cosmic noted from Suite 112, Barrow Hall, University of Georgia, Athens, Ga. 30602.

Mathematica Distributing Ramis-Adabas Interface

PRINCETON, N.J. — A "fully automatic" interface between the Ramis information processing system from Mathematica, Inc. and the Adabas data base management system from Software AG is now available from Mathematica.

While Adabas provides several facilities for accessing data, it does not include a nonprocedural language. The interface uses standard Ramis request language and follows standard rules for requesting output through the Reporting from External Files (REF) special feature, Mathematica said.

The prototype of the interface was developed by a Ramis user, then generalized by Mathematica for a broader user base. It is now available to Ramis users who have the $6,500 REF feature and can be requested from the Mathematica Product Group, P.O. Box 2392, Princeton, N.J. 03540.

Selective Structuring Seen Basis of Bank's Success

By Stephen Werdenschlag
Special to Computerworld

NEW YORK – This is not a fairy tale and it *does* have a happy ending. It is the story of a programming team meeting with incredible success and how that success was attained.

Citibank had an application which required us to write 30,000 lines of Cobol code in two man-years. On target. Under budget.

Using structured programming, design and analysis techniques as our basic frame of reference and extracting what was usable for us, we developed a system that has had zero bugs since it was put into production in February 1976.

The project was carried out by the Management Information Unit of Citibank's National Banking Group (NBG), the NBG is the portion of the bank with major domestic corporate customers and risk assets of approximately $10 billion.

Our Management Information Unit was chartered to support the management of the NBG; among other assignments, we were asked to design, develop and install a system of management profit reports that would measure the contribution to profit of approximately 200 profit centers within the NBG.

Factors of Success

There were many factors contributing to our success. Some of it is attributable to our very supportive management; we were one of the pilot groups in Citibank's decentralization program, which meant we were removed from an institutional talent bank and placed organizationally and geographically within a line unit.

And our success was also attributable to such factors as the soundness of our basic methodology; the fact that we did not have to go into production prematurely; and the fact that we thoroughly shook down the application before putting it into production.

In addition, the people were super personnel. Not only were they superior programmers, they were also excellent business people. Whether one calls them Renaissance people or not, the fact remains that they were top programmers and understood the banking business as well.

We applied a number of techniques that Yourdon, Inc. has been teaching in the seminars we attended. However, we did not follow them literally. Among those available, we used top-down design, walk-through concepts and restricted use of GOTOs.

Along with those techniques that we did use, we applied our own experiences to what we did, remaining aware of the state-of-the-art or, should we say, the state-of-the-art as it was written, albeit not as implemented.

Although we were not "GOTO-less," our standards did restrict its use. Our team got away from the hang-up of machine efficiency. We knew from the start that our coding was designed and written to be maintainable and that only after a system was in production would we then examine the bottlenecks by some sort of evaluator, such as the Problem Program Evaluator (PPE) from Boole & Babbage, and try to improve on them. We did indeed locate several in that manner.

In accordance with top-down orthodoxy, we identified major functions early, including subroutines, implementing certain ones such as input/output and, in particular, printing. The group established its own standards, refusing to be intimidated by any centralized standards.

Once under way, if we found we should have had more standards or identified more common functions, the team retrofitted them. We did not let unique routines fester, but withdrew them and replaced them with common routines. We used COPY statements.

The group had sufficient autonomy, allowing us the design of our own scaffolding and utility Procs. We isolated the routines we needed, and customized them. In fact, we constructed a *family* of Procs which used the same symbolic parameters for all components to insure consistency.

We didn't use any systems products at all. Among our Procs were those which actually got into partitioned data set directories in order to retrieve information. We had complete autonomy with our libraries. In many cases, we designed skeletons first, particularly sort skeletons.

User Involvement

We implemented in a sequence so our users received output almost immediately. We concentrated, in fact, on delivering output to the users for their reaction; input processing was the last thing which we implemented.

One of the supreme values in obtaining users' reactions was their early involvement in real computer output, forcing a response and forcing them to correct mistakes, or at least having the output conform to what they actually meant rather than what they said. There seemed to be a lot more muscle in presenting computerized output rather than sketches.

Our schedules were very accurate estimates, conforming to actual results, in part because we chopped our schedule into very small parts and did not preach that accurate estimates were required. What we did request was almost immediate feedback; we promptly played back the actual results against our estimates. We ran multiple parallel tests to the same program rather than sequential testing to a single program.

No Master File Updates

One unusual thing about this application was the way the team designed it so all files were card image files. There were no master file updates.

We had, in effect, one piece of financial data per record, which meant that the transactions and master file were all in the same format. Consolidation and purging were performed within standard sorts. There was never any need for a master file update which many applications have.

Our team did not have the group walk-through that Yourdon advocates. We did have one person on the project with the responsibility to walk through, in addi-

(Continued on Page 78)

Correction

The Inquire data base management system from Infodata Systems, Inc. [CW, May 23] can be used under IBM's VM/CMS as well as the environments noted. The package ranges in cost from $39,500 to $80,000, an Infodata spokesman added.

BMDP Adapted to PDP-11

MIDDLEBURY, Vt. – A version of the BMDP series of statistical programs has been developed for the Digital Equipment Corp. PDP-11 and will soon be available for distribution by Middlebury College, according to a spokesman.

Originally developed for biomedical DP analyses at the University of California at Los Angeles, BMDP has been implemented on a number of large-scale CPUs. The Middlebury development appears to be the first, however, for units in the PDP-11 class.

This version is said to support all the features described in the BMDP manual for large systems; two or three minor changes reportedly make the programs easier to use in the PDP-11 environment. The initial release was developed on a PDP-11/45 under RSTS/E, the college spokesman noted.

Each of the programs runs in 24K to 28K words of memory. Users need a 132-column line printer or terminal; floating-point hardware is desirable but not strictly necessary, the spokesman added.

Address space limitations reduce array dimensions within the largest program – a stepwise regression – to about one-third the default sizes of the IBM 360 versions, but "probably 80% to 85% of the problems being solved with BMDP" are small enough to run on the PDP-11 version, he estimated.

The PDP-11 BMDP package will be distributed on 9-track, 800 bit/in. magnetic tape for a one-time distribution cost of $500, which is cut to $150 for academic nonprofit institutions. More information is available from the Director of Academic Computing, Middlebury College, Voter Hall Computer Center, Middlebury, Vt. 05753.

Implementation Control 'Vital' When Outside Software Used

By Ronald A. Frank
Of the CW Staff

PHILADELPHIA – The key to effective software implementation lies in the user maintaining control of the operation. This was the advice of Mike Pitale, manager of technical support at Pennwalt Corp., during a recent Computer Caravan workshop here.

Implementation of programs acquired for outside sources can be done three ways, according to Pitale. The software can be purchased with customization, it can be purchased with conversion or it can be purchased "as-is."

Several case histories illustrate the various options available to the user, he said. As one example, an implementation of a standard cost inventory control system for a drug house involved 42 programs and was so unique that the total design was done in-house.

In this case, outside programmers worked directly for members of the company programming staff so there was no question about whether the user knew what was going on, he said.

Control was maintained by the in-house staff by regularly checking the coding work done by the outside workers. The system worked successfully because at no time was control shifted away from the people who would ultimately have to work with the system, he said.

The second example cited by Pitale was a customization/conversion effort for a bank. The system was being shifted from RCA to IBM hardware and from DOS to OS/VS1 at the same time.

Most of the software efforts were spent on the user's customization requirements instead of on the conversion problems. As a result, it was later necessary to have a heavy in-house effort to straighten out the system.

Another example consisted of an inquiry package that was brought in-house as-is, "with no promises." The user established a sample system and experimented with various options.

Demonstrations were given to various prospective users and the proper groundwork for implementing the system was done, Pitale said. This system was an instant success and it set basic requirements for future software, he noted.

Summarizing the best way for a user to proceed with software implementation, Pitale said there should be a technical evaluation of the product along with a evaluation. An implementation date should be set by figuring how long it appears it will take to do the job – and then doubling the time.

In-house resources should be used and at no time should in-house control be given up, he recommended.

It is also helpful to talk to other users of the same software, but this should be done with caution since situations and needs are never totally identical, he pointed out.

Selective Structuring Seen Success Factor

(Continued from Page 77)

tion to other programming tasks, to ensure conformity between specifications and programs.

In effect, she walked through every line of code and every line of specifications and noted where they were incompatible. Sometimes that lack of conformity was resolved immediately, sometimes it went on a list of tasks to be dealt with at a later time. In either case, we were constantly aware of where our code didn't conform to the specifications.

In essence, Yourdon advocates a repertoire of techiques in its seminars. For us, the intrinsic value lay in the offering of the entire repertoire without being dogmatic about any of it.

Obviously some of these methods matched our needs better than others. The team had the perception to see what applied to us and what we could discard.

Those we rejected or didn't use were discarded not because of their quality, but because of inapplicability. Our team was responsible for the analysis, design and implementation and we knew we would be around when the users saw the results.

I was fortunate enough to be the senior computer person involved; I was working for someone who was not computer-oriented. My decisions had to be relied upon by my management, and it gave me a great deal of freedom that I might not have had in other circumstances.

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For On-Site Nets

Alternate Mode Outlined for High-Speed Transmission

By W. Byron Whartnaby
And Rob Erwin
Special to Computerworld

With the proliferation of distributed computer networks, the need to support physically contiguous high-speed terminal devices by a nodal/host processor or a multiplexer/concentrator poses several problems for the data communications engineer or systems planner.

Voice-grade, wideband and switched (dial) networks, in conjunction with traditional analog data modems, traditionally have provided the medium that has supported remote terminal devices.

These typical modem/telephone line conformations are ideally suited to the needs of a terminal user when the terminal devices are located at some distance from the supporting processor.

Usually, this distance can be defined as a situation in which the transmission medium (telephone line and/or combination of channel facilities) passes through more than one telephone company central office.

This "circuit" can be metallic loaded or unloaded cable or a mixture of wire, cable or radio frequency carrier systems.

When a terminal is within continuous cabling distance (for example, 100- to 10,000 ft or more) several alternative approaches can be taken to provide the communications path.

One popular method is the application of short-haul or limited distance data sets.

These devices offer substantial savings as compared to voice-grade or wideband analog modems. They are usually easy to install and normally require little or no periodic maintenance.

Typically, limited-distance data sets are field-programmable or strap-selected to operate at most of the popular data rates as 2.4-, 4.8-, 9.6 and 19.2 kbit/sec.

Although providing savings and operational flexibility, short-haul or limited-distance data sets are not always the optimum solution for the "close-in" type data transmission applications.

Several disadvantages in using limited distance data sets are:

- In the very short range application (less than 4,000 ft) limited distance data sets are not always cost effective.
- Multiple speed limited distance data sets are usually limited to a maximum speed of 20 kbit/sec.
- For data rates in excess of 20 kbit/sec, limited-distance data sets must be selected for a fixed speed.

A unique and simple alternative to supporting contiguous terminals is through a data set or modem eliminator. A device of this type provides a very cost effective solution to the close-in (100 ft or less) data transmission requirement, since one eliminator replaces two limited-distance data sets or analog modems.

	Modem Eliminator	Limited Distance Data Set
Purchase Price (Range)	$300 to $1,200 Single-Unit Price	$800 to $3,000 per pair
Full-Duplex Operation	Yes	Yes
Half-Duplex Operation	Yes- Option With Some Models	Yes/No
Multipoint Polled Operation	Not Normally Available- Can Emulate Polling With Interface Hubbing	Yes/No
Multispeed Operation	Yes	Yes/No Some Fixed Data Rates Only
Operating Speeds Available in One Unit	Typically: 2.4-, 4.8-, 9.6-, 19.2 kbit/sec Available: 38.4-, 40.3-, 230.4-, 1M bit/sec	Typically: 2.4-, 4.8-, 9.6-, 19.2 kbit/sec
RS-232C Interface	Yes	Yes
301/303 Interface	Option	Option
Loop Switches and LED Displays Provided	Yes/No	Yes
Maximum Range	50 to 5,000 ft	20 Miles
Type of Cable	5 to 11 Pairs (10 to 22 Conductors)	1 or 2 Pairs (2 or 4 Conductors)
Number of Devices Required per Data Link	1	2

Comparison of Modem Eliminator and Limited-Distance Data Set

The accompanying table summarizes several of the characteristics and costs when comparing limited-distance data sets to a modem eliminator.

It becomes apparent that a single-modem eliminator is approximately one-third the cost of some limited-distance data sets.

A modem eliminator electrically "sits" between a terminal and the host processor/-front end.

The eliminator electrically appears at both of its digital interfaces as a standard synchronous data set or modem.

The EIA RS-232 or 301/303 interface cable that is attached to the terminal and processor/front end simply connects to the two mating connectors located on the

(Continued on Page 86)

Network Forecast: More User-Oriented

By Esther Surden
Of th CW Staff

PHILADELPHIA — The evolution of communications equipment points to a day when nets will become more user-oriented, according to Elizabeth Severino, president of E.F.S. Associates.

"Terminals can put computing power where the work is," Severino told attendees of a recent *Computerworld* Computer Caravan here. "I really do believe terminal nets are a wave of the future."

Terminal networks distribute either processing, data or communications. The communications aspects are evolving along equipment lines.

"We started out by attaching a cable to input devices," and soon "someone realized the input devices could be put within 100 feet of the terminal," she said.

Then the cost of a single line per terminal became too expensive, so multidrop lines were invented. At that time, communications costs "exceeded 50% of the cost of the system," she added.

Multidrop lines increased throughput by a factor of 10 while system cost only increased slightly.

Software for the network was becoming very expensive, Severino noted, so front-end processors were developed to offload the communications from the mainframe. Simultaneously, minis began to be used in this way.

Later, front-end processors were removed from the mainframe's computer room and became known as concentrators and people "then slapped another front-end processor to receive the information that came in from other processors," she said.

The processing can be distributed in a number of ways, Severino continued. One of the more familiar of these is the heirarchical system in which the mainframe is king.

In this kind of system, such functions as I/O control, peripheral control and maintenance and diagnostics can be offloaded, she indicated.

The horizontal approach involves processors that either can be polled in an orderly manner, as in the ring configuration, or processors that each take the total respon-

(Continued on Page 85)

Concurrency Key to TI's IBM Emulation Package

HOUSTON — Texas Instruments, Inc. has added IBM 2780/3780 emulation capabilities to its data exchange system (DXS) communications product line.

The emulator can operate concurrently with all other functions on the DXS system, according to the firm.

The remote job processor (RJP) emulator supports multiple lines to allow data transfer to one or more hosts or RJP terminals, the firm said.

Emulation is controlled by a set of menu-driven inquiry/response screens on TI Model 914A CRT terminals. These functions reportedly provide for easy management of control parameters, job creation and submission, statistics and emulator status display.

The RJP emulator package additionally allows transfer of disk and tape files, including DXS terminal source editor library members. The use of disk files and I/O spooling compensate for the absence of multileaving, TI said, claiming this deficiency is a common objection to the 3780 packages.

Additional Functions

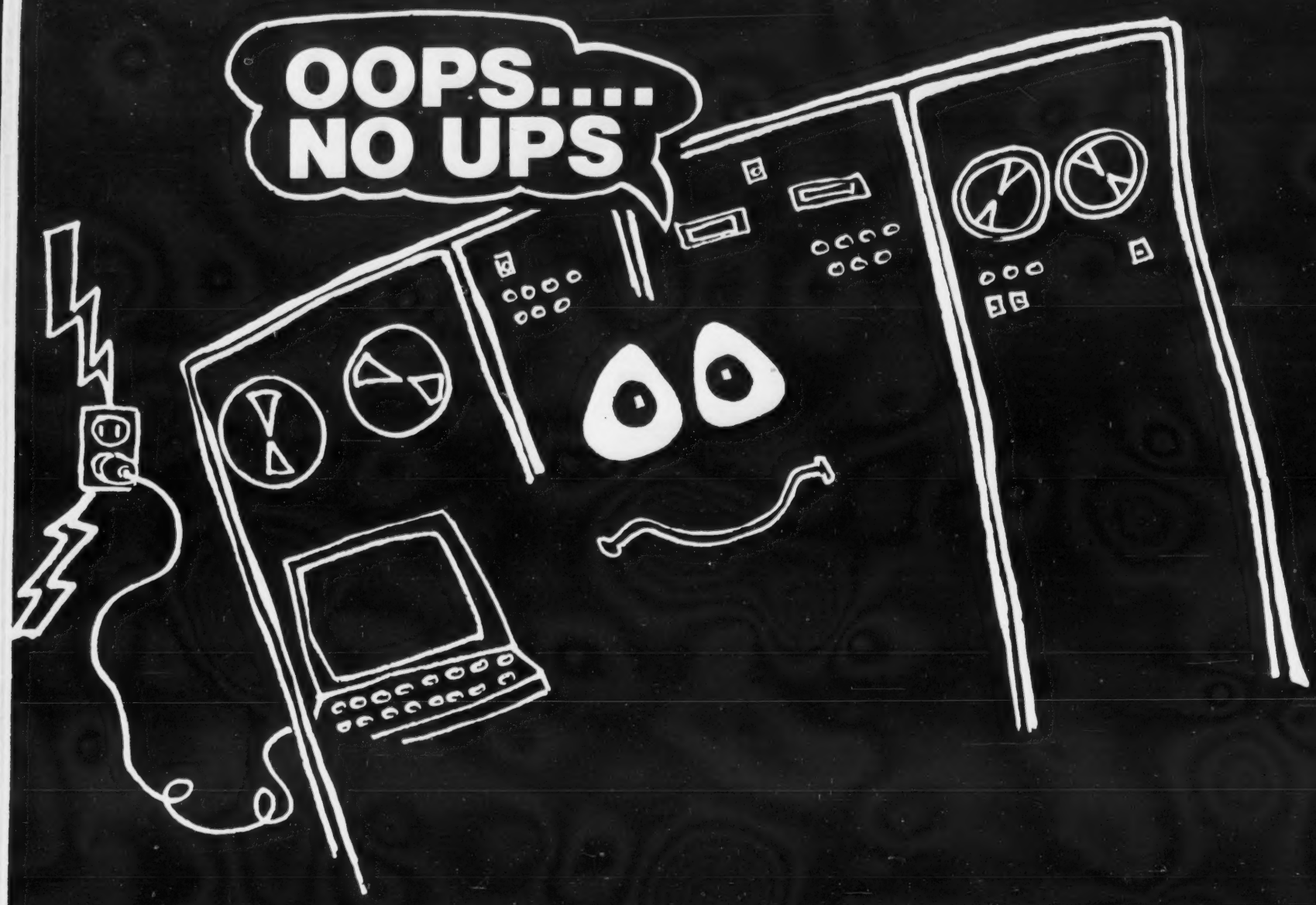
Additional functions such as concatenation of data sets, logging of operator messages and user program activation are executed by the RJP's set of data stream control records, TI said.

There is a two-host line requirement for the concurrent DXS simultaneous, on-line interaction and batch transmission operations, the company noted.

Communications supported by the emulator take place in half-duplex mode through user-supplied modems and common-carrier or equivalent private facilities. Full-duplex lines can be utilized by certain modems to minimize line turnaround time, TI added.

Dial-up line support includes auto answer if that capability is supported by the modem.

The RJP communications emulator software costs $2,750 from the company, which can be reached at P.O. Box 1444, M/S 784, Houston, Texas 77001.



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For Order Entry, Merchandise Planning

Catalog Firm Gears Up Slowly for Full System Link

By John P. Hebert
Of the CW Staff

ATLANTA – A large catalog showroom firm here decided to obtain a communications system to improve customer service and provide better control over daily operations.

But although Ellman's, Inc. installed IBM 3790 systems in each of its four branches here and in stores in the greater Atlanta area last fall, the systems don't communicate with each other or with the firm's IBM 370/115 mainframe.

According to Terry Hughes, Ellman's "conservative" manager of information systems, the communications systems "are not tied at all. The branches dump on diskette and the tapes are manually carried to the DP center" in Ellman's largest showroom here.

Then why a communications system? "Because we are interested in capturing information as the order process is ongoing. That process is now a lot cleaner, a lot smoother. The 3790s operate independently, but they will communicate with the 370/115 someday," Hughes said.

The next step, he said, is a move to batch transfer to replace all manual steps. That will allow central access to remote 3790s and let the firm pull information it needs off the system. It can then process the data and retransmit it daily before 3 a.m. during the third shift, Hughes explained.

Tubes Replaced

The 3790 systems replaced a pneumatic vacuum tube operation. IBM 3277 CRT terminals and IBM 3286 printers attached to the 3791 controllers now capture the sales orders, produce price and extended picking tickets and update the order files, Hughes said.

A perpetual inventory is then broken up into logical pieces to conform to and enhance the organization of Ellman's merchandise catalog, he added.

According to Al Katz, vice-president of marketing, "the 3790 will play an important role in our computerized merchandise management system and is helping us find new ways to improve merchandising methods and inventory control."

Showroom customers still fill in their own order blanks, as they did under the manual system, but order entry clerks neither manually check each item's catalog number and price, nor do they send it through the pneumatic tube to the warehouse, he added. Instead, the clerk types in the order on the CRT terminal.

The 3790-gathered information produces sales and profit information for each merchandise category, which, Katz said, "will let us examine our business more carefully, allowing us to see how we can maximize sales.

"This wasn't possible before, because information was usually assembled days after the fact and our buyers didn't have enough time to react to sales trends," he said.

The first 3790 was brought in on a pilot basis last September, when the basic programming was performed, according to Hughes. The system was in a test mode through the Christmas season to make sure it could handle the holiday volume, he said.

It handled 30,000 orders in November and 72,000 in December. "A substantial portion of Ellman's $28 million yearly sales volume takes place during an eight-week period in November and December," Katz added.

Strict Search

Although Katz and Hughes indicated Ellman's was "unrealistic" in obtaining the 370/115, Hughes said the search for the right communications system was more objective.

"I went out and talked to several different [vendors]," Hughes recalled. "We were looking for a system which was easy to program and for a vendor which did not force an overcommitment at the outset and which had support backup."

Hughes looked at Digital Equipment Corp. machines, but turned them down because "you end up buying through a distributor." Sycor, Inc. was eliminated because "the systems are limited to eight devices and the distance restriction was fairly short," he said.

IBM was finally chosen by Ellman's because the company knew the vendor would not go out of business. Ellman's is a small company and wanted to be careful on committing itself before the test period had ended, Hughes explained.

IBM offered a 3790 and the control unit on a 30-day notice "and that was a good way to get the system and not overcommit the company," Hughes said.

A competitor of Ellman's "has a Micos system from Mini-Computer Systems, Inc. with a lot of luxuries – things he can do because he provides his own support. But with Ellman's, it's a matter of practicality," Hughes said.

The catalog showroom firm is opening a new store in Greensboro, N.C., in the near future. Hughes and Katz agreed that a 3790 will also be installed there and will communicate directly with the main 3790 system here, rather than the 370 mainframe.

Graf/Pen Linked With TTYs

SOUTHPORT, Conn. – Science Accessories Corp. (SAC) has introduced the Model 1428 interface for utilizing Graf/Pen sonic digitizers with RS-232C or Teletype-compatible devices.

The use of either parallel binary or BCD on the data bus of GP-3 or NT-301 digitizers gives a voltage pattern with weighted values which may be interpreted in the graphic display or host CPU, SAC noted. Outputs from the Model 1428 may be either serial Ascii for BCD or serial octal Ascii for binary, it added.

The interface consists of two printed circuit logic cards which are installed in the unit's chassis. No additional power supplies are necessary. Connection to the RS-232C is via a single cable from the rear of the 1428, which costs $575.

SAC is at 970 Kings Highway W., 06490.

Users Planning Terminal Networks Warned Against 'Seven Deadly Sins'

By Ronald A. Frank
Of the CW Staff

PHILADELPHIA — The best way to implement a successful terminal communications network is for users to avoid the "seven deadly sins" associated with managing these nets.

This advice was outlined by Neil Gorchow, vice-president for product strategy and requirements at Sperry Univac, at a recent Computer Caravan session.

First, users should not freeze the network definition before implementation to allow for growth. Instead an "adversary document" should be written on exactly what will be provided by the network. This should then be shown to the potential users for them to critique, Gorchow said.

Next, users should not try to utilize a network before it is fully checked out. This means that enough time for integration and testing should be allowed. Typically the time required for this network integration should be as long as the steps required for all other phases of network development, he said.

Pinpoint Abnormalities

Third, users should be aware of abnormal conditions and design a net to allow for Murphy's Law, which states anything that can go wrong will go wrong.

Next, the network designer should allow for Parkinson's Law, which states that the work will expand to equal or exceed the capacity of the network. Therefore, the users should include a built-in "throttle" to shut off data input to the net when its transmission load reaches 85% of total capacity, Gorchow suggested.

As a fifth pitfall, Gorchow warned against using custom software for network development unless absolutely necessary. Custom software is more costly and takes longer to complete, so for this reason it is usually better to accept the penalty of some inefficiency by utilizing available software, he said.

Next, network designers should consider the needs of human engineering. Many system designers work on a terminal network from the central DP center outward with the terminal user getting last consideration. System hardware should not be optimized at the expense of the end user.

Finally, the network should take into account the needs of the end user. The proper training of the network user is crucial to the successful implementation of the network, Gorchow advised.

Today an estimated 30% of this country's workers interact with a terminal and/or a network during the course of a typical workday. By 1985, 70% of the work force will be interacting with some type of a terminal network, he predicted.

Datek Offers Rugged. 300 Bit/Sec Coupler

CHAPEL HILL, N.C. — Datec, Inc. has a ruggedized acoustic coupler which can tolerate temperature extremes and withstand hard impacts, according to the firm.

The Datec 30 plugs into a teleprinter terminal and accepts a standard telephone handset.

The coupler provides Bell System 103/113 compatibility, full- or half-duplex operation and 300 bit/sec transmission, Datec said.

Both the transmitter and receiver are crystal-controlled and incorporate C/MOS digital integrated circuits for stable frequency generation and discrimination, it added.

The carrier detector circuit measures received base-band signal-to-noise ratio and operates independently of received signal amplitude.

A connector provides both RS-232 and Teletype-compatible interfaces. Simultaneous operation of two teleprinters is possible with a terminal splitter attachment, the company noted.

The unit costs $310 from Datec, which can be reached at P.O. Box 839, Chapel Hill, N.C. 27514.

Paradyne Adds Console Support Package

LARGO, Fla. — Paradyne Corp. has unveiled a console support package that is said to allow users of distributed networks to replace IBM Hasp or Job Entry System multileaving workstations with Paradyne's PIX II virtual data links.

The software permits users at remote sites to control jobs transmitted to central mainframes under IBM's Synchronous Data Link Control (SDLC) protocol, Paradyne stated.

IBM Vtam/NCP teleprocessing software, which must normally be implemented to support SDLC protocol, is not required. The PIX II system also eliminates the Rtam software normally needed to support multileaving workstations, the company said.

The console support package provides a level of control not previously available to remote site users, a spokesman claimed.

The package provides control for as many as 24 peripheral devices at each remote site, including card readers, printers, tape drives and interactive terminals operating concurrently.

PIX II virtual data links enhanced with the console support package also provide multileaving, data compression and error recovery.

The data link allows remote peripheral devices to operate as if they were locally connected to a mainframe.

Virtual data link systems consist of a local control unit, which plugs directly into the byte multiplexer channel on the host, and one or more remote control units (RCU) to which peripherals are attached.

Data is transmitted between PIX II control units in full-duplex SDLC frames. The virtual data link, rather than the host processor, performs both data compression and multileaving functions, Paradyne said.

To use SDLC under the traditional IBM teleprocessing approach requires implementation of Vtam/NCP teleprocessing software. That means a massive programming effort and, most likely, hardware upgrades, the spokesman contended.

PIX II with the console support package also permits users to eliminate Rtam teleprocessing software and saves at least one port on an IBM 370X front end, the spokesman said. In many applications the front end controller can be eliminated entirely, he claimed.

Consoles attached to the RCU in a PIX II configuration function as if they were IBM 3277, 3215 or 1052 devices, he said.

The console support package allows PIX II systems to operate as Hasp workstations under OS/MFT, OS/MVT or OS/VS2-SVS and as JES workstations under OS/-VS1 or OS/VS2-MVS, he stated. Full tape drive support and SDLC communications are provided under any of those operating systems.

Software to support the console package is available to PIX II users without charge; the console itself adds approximately $125/mo to the cost of a PIX II system.

The package and console have a 90-day delivery schedule, Paradyne said from 8550 Ulmerton Road, Largo, Fla. 33541.

AJ Offers Coupler

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has introduced the A 242A acoustic coupler, which operates up to 450 bit/sec in the originate mode.

The A 242A features flush-mounted acoustic cups to lock in the telephone handset; a vibration isolation technique; and a quartz crystal control of both transmitter and receiver to provide drift-free frequencies, according to a spokesman.

The coupler includes a user-oriented carrier detector that senses valid data regardless of the carrier level, allowing extremely weak but clear signals to be used and rejecting noisy signals no matter how large, he said.

It also has both EIA RS-232 and current loop interfaces.

The A 242A costs $365 from AJ at 521 Charcot Ave., San Jose, Calif. 95131.

Prediction for Nets: More User-Oriented

(Continued from Page 81)

sibility for the data, as in a star configuration.

With distributed data, the user has to worry about the data bases which can either be distributed or centralized. In the centralized system, all data — in terms of the applications using it — resides in some centralized location.

Fits Line Management

This fits perfectly into a line management organization, she said, but it may not be useful in certain cases.

For distributed data bases, users can either partition it by having data relevant to a specific work area at the system in that area, or replicate it, having the data base at Site A and Site B as a design function.

Data bases in a hierarchical distribution allow individual minis to transmit summary-type information back to the host. A hybrid application allows the part of the data base most likely to be used by a particular mini to reside with that mini.

Although designing such a data base may be a bit tricky, a bank in California has found that "more often than not, they did a good job of guessing where the data base should be," Severino noted.

Updating Problems

Replication of a data base can create a massive updating problem, she added. The user must know the application very well to decide if this approach is good for him.

Effectively, developments in distributed processing, DP and communications will effect the end user to the point that "we are looking toward the concept of the electronic office," Severino continued.

A point-of-work concept is developing in which we "are going to have a trend toward independence and efficiency on the part of the user," she predicted.

Human Limitations

Of all the costs associated with communications nets, the highest will come in the area of the human interface, she added. Other parts of the system can benefit from economies in scale, but the CRT and keyboard and the like are limited by the human body, she explained.

The DP department will be using more applications packages in the future because "software is becoming unbelievably expensive. Anything you can do to reduce software costs is a desirable thing to do," she told the group.

"Canned software properly done saves everyone time and money," Severino added.

Eliminator Offers Tranmission Option

(Continued from Page 81)

eliminator.

Basically, in a modem eliminator, transmitted data at both interfaces becomes receive data at the opposite interface. Clocks and controls are also provided.

Many modem eliminators offer request-to-send/clear-to-send delay circuits that emulate half-duplex data sets.

This delay allows for dynamic on-off controls that are sometimes required for hardware/software protocol compatibility.

A programmable divider chain permits selection of the required synchronous data rate; i.e., 2.4-, 4-, 9.6 or 19.2 kbit/sec.

Location Beyond Limits

A unique problem arises when a terminal is physically located beyond the nominal limits of the EIA RS-232C and 301/303 cabling requirements (normally past 100 ft).

Traditionally, users have been required to revert to data sets to solve this particular problem.

If the terminal is located, for example, at 1,000 ft or so from the host processor/front end, data sets interconnected with two or four wires can provide the transmission medium.

This solution — two data sets — is still more expensive than if one of the modem eliminators' interface could be "extended" to this 1,000 ft. distance.

An option, available in one particular modem eliminator, is capable of electrically extending the terminal interface up to 5,000 ft.

This feature allows the user to maintain considerable cost savings over two data sets, even though the interconnecting cable will use 10 to 18 conductors.

The data, clocks and controls that were assigned to the terminal connector located on the back of the modem eliminator are now routed to an optional driver circuit board that converts the normal signals into a form suitable for transmission over long cable.

At the distant end of the multipair cable, a small box referred to as a remote cable extender (RCE) recovers the incoming signals from the long interconnecting cable and converts the data, clocks and control signals back into the appropriate RS-232C or 301/303 interface.

The RCE is powered (low-level dc) through the long interconnecting cable.

A remote test switch, located in the main modem eliminator, can command an unattended digital loop at the interface of the RCE. Thus, a closed-loop, down-and-back data test can be performed from the processor/front-end location.

Application Performed

In one application, a modem eliminator in conjunction with the RCE drove approximately 1,500 ft of 8-pair telephone wire between two buildings situated across the street from each other.

At the time of installation, using a bit-error rate test set, with the remote digital-loop feature, bit-error rates were taken at different operating speeds to determine total performance.

At first, the modem eliminator was programmed to operate at 9.6 kbit/sec. A down-and-back test to the RCE and return, over almost 3,000 ft of cable, showed no errors.

The speeds were increased to 19.2, 38.4-, 57.6-, 76.8- and 230.4 kbit/sec. Each test ran error-free.

The tests were stopped at 230.4 kbit/sec since the test set interface was not capable of operating above this rate. The modem eliminator tested is capable of data rates to 921.6 kbit/sec.

Once the tests were performed, the appropriate computer/terminal equipment was connected after reprogramming the modem eliminator back to 9.6 kbit/sec.

At the CPU location, an IBM 3705 was attached to the modem eliminator. The 3705 was operating in a partitioned emulation program, under version five of IBM's Network Control Program (PEP/NCP-5). Across the street, a Data 100 Corp. Model 76 terminal was connected to the RCE. The line was activated and communication was established between the terminal emulating an IBM 360/20 and two tightly coupled IBM 370/168s (MVS 3.7, JES-2, 3.0).

While the error rate tests were being performed, a frequency-selective voltmeter was connected across adjacent cables within the multipair bundle to detect if the data, clocks or control signals being transmitted to and from the remote cable extender box would interfere with other circuits.

The highest signal level detected was -52 dBm at 9,600 Hz. Since this level falls far enough below and out-of-band to the normal levels encountered in these circuits, no interference occurred in adjacent circuits.

Whartnaby is president of the Teleproducts Division of Designed Enclosures, Inc.; Erwin is senior systems analyst of Southern California Edison Co.

Comet Bows

TETERBORO, N.J. — Compuscan, Inc. has introduced Comet, an optical message entry terminal.

Comet is a telecommunications message handling product that extends the capability of Compuscan's Alphacomm page reader with features for message control and transmission.

It also adds a visual display and keyboard for increased editing capability and prompted manual entry messages.

The terminal is equipped with a modified Alphacomm and is modularly designed so that memory increments and disk devices can be added for logging and accounting functions.

The average price for the message terminal system is $62,000. Deliveries are expected to begin this fall from Compuscan at 900 Huyler St., Teterboro, N.J. 07608.

CDS Has 'Versatile' CRT

NEWARK, Del. — The Versatile CRT from Computer Data Systems (CDS) allows users to individually select software and components that are compatible with the firm's S-100 bus.

The terminal consists of a 9-in. monitor, an ASR-33-type Ascii keyboard and power supply assembled in a cabinet, the company stated.

It includes a card rack with space for 10 S-100 bus cards and a mother board with room for 10 100-pin Altair/Imsai-compatible edge connectors, CDS added.

The display features 500-line resolution and controls for horizontal and vertical movement and contrast and brightness, it noted.

The versatile CRT comes with plugs and connectors, has a 90-day warranty and costs $699.95, according to the firm in English Village, Atram #3, 09711.

Maintenance, Technical Support Weak Overall

Memorex, Teletype CRTs Rated Tops in User Survey

By John P. Hebert
Of the CW Staff

DELRAN, N.J. — A recent survey of alphanumeric CRT terminal users revealed that terminals produced by Memorex Corp. and Teletype Corp. rated highest in overall performance.

Users surveyed by Datapro Research Corp. here placed Hewlett-Packard Co. CRTs next, followed closely by NCR Corp., Applied Digital Data Systems, Inc., Genesis One, IBM and Lear Siegler, Inc. terminals, the research company said.

According to the results of the survey completed last March, 41% of the 711 respondents had IBM equipment which accounted for 45% of the 18,390 terminals used overall.

Those surveyed were asked to rate their equipment in seven categories: overall performance, ease of operation, display clarity, keyboard feel and usability, hardware reliability, maintenance service and software and technical support.

User's ratings of excellent, good, fair and poor were translated by the research firm into weighted averages of 4, 3, 2 and 1, respectively, Datapro said.

Users demonstrated they were pleased with their terminals in terms of the first five of these seven categories, which received ratings of 3.4, 3.5, 3.3, 3.3 and 3.3 respectively, overall.

But they were generally less satisfied with vendors' maintenance service, which received a rating of 3.1 and software and technical support, which users rated 2.8 overall.

IBM terminal users rated their CRTs eighth in the overall performance category, although IBM enjoyed the largest user and equipment base of those surveyed, according to the report.

Users were also asked to tell the research firm how they used their terminals, what protocols with which the devices are compatible, in what applications they are used and the advantages and disadvantages of their particular terminals.

Most users (69%) said their terminals acted as local peripherals connected to a mainframe, although 64% used them in "fill-in-the-blanks" formatted data entry applications. These were closely followed by applications where the displays were connected via communications lines. (62%).

Twenty one percent of the terminals employed IBM 3270/3275 protocol emulation, while Teletype's models 33 and 35 were emulated by 14% of the terminals, Datapro said.

Datapro noted it was no surprise that data entry and file inquiry applications received the most responses on the question of applications (71% and 77%, respectively), while status reporting and terminal console applications came in third and fourth in the applications area, with 28% and 24% of user responses.

The research firm noted that the percentages do not equal 100% because most terminals are used in more than one application.

On the question of advantages, most users (56%) said the reliability of their display terminals was an advantage, 42% liked the strong vendor support and 27% said flexibility was definitely an advantage.

Low cost was cited as an advantage by 40% of the users, Datapro said.

Thirty-five percent of the users thought the high cost of their terminals was definitely a disadvantage, 8% said the devices they used were not flexible enough and only 4% cited unreliability as a major disadvantage, according to Datapro.

Nonprogrammability was found to be a disadvantage in the minds of 19% of the users surveyed; and performance limitations, maintainability and poor vendor support were also listed as reasons for users' distress with their devices, the researchers found.

In addition to the user survey, Datapro's 61-page report, entitled, "All About Alphanumeric Display Terminals," contains comparison charts of 220 display terminals currently offered by 79 vendors, plus guidance in selecting and applying the devices, their history and future outlook.

"All About Alphanumeric Display Terminals" is available for $12 from Datapro at 1805 Underwood Blvd., 08075.

Terminal Transactions

CRT Controllers Rack-Mountable

ANN ARBOR, Mich. — A series of rack-mountable CRT display controllers has been announced by Ann Arbor Terminals, Inc.

The basic version of Ann Arbor's R-Case series is functionally complete and includes timing, memory, cursor and the appropriate serial keyboard send/receive boards, in addition to a power supply.

The units are available in alphanumeric display formats ranging from eight lines of 32 characters to 24 lines of 80 characters and can drive single or multiple arrangements of RS-170 monitors.

R-Case units are also teletypewriter-compatible, according to the firm.

Configurations of the controllers include a single unit in the R-Case, two units bolted together and rack mounting in single or dual configurations, Ann Arbor stated.

A multidrop option is available which allows up to 64 displays to be remotely addressed and transmitted through a communications link, the company said.

Other options include character accent, batch transmit and editing capabilities and printer add-ons.

R-Case prices begin at $720, depending on the interface, display format required and options. The company is located at 6107 Jackson Road, 48103.

UPC Scanner Shortens Lines at Texas Supermarket

LUBBOCK, Texas — A point-of-sale (POS) scanning system installed last October at the headquarters supermarket of Furr's here has been credited with reducing the customers' wait in checkout lines and has already partially paid for itself.

There are no long lines at Furr's No. 1 because the best of the checkers are "ringing up" more than 35 items per minute and their productivity is said to be improving with each shift, the company said.

This is one aspect of the computerized Universal Product Code (UPC) scanning system in operation at the 12-lane supermarket.

The installation of 14 NCR 255 POS terminals and a dual processor NCR 726 minicomputer system is reportedly making a return on the $167,000 investment, partially because the store no longer price marks each item.

"We quit that the day we started slot scanning," Roy K. Furr, president of the company said. "Within four days, most of the stock had been replenished and the only things still marked were the slower moving ones."

One reason for shoppers' apparent acceptance of the new system, in addition to speedier checkout lane service, is the detailed sales receipt they now get. Store location, date, department identification for each purchase, its price and verbal description, change due, number of trading stamps given, time of day, lane and checker numbers and other information are detailed for the customer.

Shelf price markers are augmented with even bolder tags which draw attention to price reductions and special buys, Robert Green, vice-president of retail operations, noted.

"Yet another plus for the consumer," Green said, "is the system's prepricing for specials. Checkers don't have to memorize these anymore; they're just programmed into the computer before the store opens each day."

Equipment Configuration

The checkout lanes at Furr's No. 1 are equipped with the modular sales terminals with a keyboard and operator display, customer display panel, remote cash drawer and three-station printer.

In the business office at Furr's No. 1 is the dual processor minicomputer which stores all of the prices. The configuration has magnetic drum memory for lookup of up to 13,800 items and a magnetic disk unit for backup. If one unit should ever go down or malfunction for any reason, Green explained, the other would permit checkers to carry on as usual.

Store manager Richard Moseley enters price changes on the computer through a back office NCR 255 terminal. Another 255 is used for checking out checkers at the end of their shifts. UPC labels for items which don't come imprinted by the vendor are also produced in the back office.

What isn't as obvious to customers as the speed and more informative sales receipt of the new system, Green noted, is its inherent accuracy.

"The scanners don't make mistakes," he said. "If an item isn't held properly so the UPC can be read, the operator is alerted because the second light doesn't flash and the item isn't recorded.

Terminal Transactions

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Another advantage of the system is that customers don't have to tell the checker that they're taking advantage of such buying inducements as three-for-a-dollar offers, he said. The first two items to be scanned trigger the regular price, 34 cents, while the third triggers the accumulated savings price, 32 cents.

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In addition to the scanning installation at No. 1, the company has the NCR terminals and minicomputer controllers in 11 other stores.

Under a recently adopted program, the remaining 62 supermarkets and any new ones built or acquired will be outfitted with terminals just as rapidly as the company can afford to make the changeover, Furr's president stated.

To speed the conversion with minimal initial capital investment, Furr continued, the company will order the terminals without the logic board required for scanning. Then, as each store is scheduled for that ultimate step, the terminals can be upgraded.

"There is no question in my mind about the inevitability of slot scanning," Furr declared. "That's the way the whole grocery industry will go, and it will have as much impact as the concept of self-service did in its day."

PTS-100 Now Permits Uniscope Emulation

NORWOOD, Mass. — Raytheon Data Systems Co. has added hardware and software enhancements to its PTS-100 series of programmable terminal systems which allow those systems to emulate Univac Uniscope U-100 remote terminal systems.

The hardware enhancement is a modified display drive module which provides U-100 compatibility. The emulator operates through a four-wire, RS-232-C Ascii communications interface which supports synchronous transmission to Univac processors at speeds up to 9,600 bit/sec, according to the company.

A variety of printers are supported by the PTS-100 system in the Uniscope emulation mode, with speeds ranging from 15 char./sec to 300 line/min, the company said.

The printers can operate in a buffered mode, with buffer space allotted within the system for each printer attached, or unbuffered, with printers sharing the buffer areas of their associated display stations, Raytheon noted. Several Raytheon display terminals can also share a common printer.

Prices for a PTS-100 system capable of emulating Uniscope U-100 remote equipment range from $505/mo for a four-terminal system on a three-year contract or $1,552/mo for a 16-terminal configuration. Purchase prices for those systems are $19,560 and $56,740 respectively, a Raytheon spokesman noted from 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

AJ Offers Teleprinter, Universal Handset Cups

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has introduced a 60 char./sec teleprinter and has added universal phone handset cups to two acoustic couplers.

The AJ 860 is a desktop teleprinter terminal which was designed for interactive time-sharing or transaction processing applications.

It features a nine-wire dot matrix print element which permits the printing of 5 by 9 dot matrix characters in upper- or lower-case, according to the firm.

Additional features of the 860 include 132-column printing at recovery speeds up to 90 char./sec; horizontal and vertical tabbing; reverse line feed; automatic pagination; and operator-selectable printing speeds of 10-, 30 or 60 char./sec, AJ said.

The terminal's keyboard includes a 17-key numeric pad with n-key rollover and automatic repeat. Self-test diagnostics, dual gate forms tractor and 94 printable character operation are additional features incorporated in the standard 860, the company noted.

Universal Cups

The AM 211 and A 211 acoustic couplers are designed to meet the CCITT's requirements for the international data communications industry with the addition of movable cups to accommodate different telephone styles.

The acoustic couplers are also said to have an improved design of the carrier detector circuit, which accepts signals that are clear but extremely weak; crystal-controlled carrier and discrimination circuits to provide stable operation with low noise distortion; and a transmitter that provides drift-free performance.

Transmission rate capabilities of either device are up to 300 bit/sec, and half- or full-duplex operation is switch-selectable, AJ said.

Both couplers operate in an originate-only mode. The AM 211 has an acoustic interface and can also be directly connected to the telephone line, whereas the A 211 only has acoustic interfacing capabilities, according to the firm.

The AM 211 costs $495; the A 211 price was not available.

The AJ 860 costs $2,950, with deliveries scheduled for late fall. AJ is at 521 Charcot Ave., San Jose, Calif. 95131.

Terminal Kit Features 16 Lines, Scrolling

SAN ANTONIO, Texas — A terminal kit that reportedly provides 16 lines of 64 or 32 characters, scrolling and complete cursor control has been introduced by Southwest Technical Products Corp.

The CT-64 features a 128-character Ascii display with switchable upper- or upper- and lower-case characters and two 1K memory pages. The terminal can be used with any 8-bit computer, according to a Southwest spokesman.

The CT-64 terminal offers scrolling or page mode opeation, 32 control character decoding, selectable control character printing and character or word highlighting.

The terminal provides full cursor control, limited editing capabilities, scroll or page, solid or blinking cursor, page selection and end-of-page warning signal, according to the spokesman.

The kit comes with keyboard, power supply, 110- to 1,200 bit/-sec interface and case and costs $375. The optional CRT is another $175, Southwest said from 219 W. Rhapsody, San Antonio, Texas 78216.

UPC Scanner Shortens Lines at Texas Supermarket

LUBBOCK, Texas — A point-of-sale (POS) scanning system installed last October at the headquarters supermarket of Furr's here has been credited with reducing the customers' wait in checkout lines and has already partially paid for itself.

There are no long lines at Furr's No. 1 because the best of the checkers are "ringing up" more than 35 items per minute and their productivity is said to be improving with each shift, the company said.

This is one aspect of the computerized Universal Product Code (UPC) scanning system in operation at the 12-lane supermarket.

The installation of 14 NCR 255 POS terminals and a dual processor NCR 726 minicomputer system is reportedly making a return on the $167,000 investment, partially because the store no longer price marks each item.

"We quit that the day we started slot scanning," Roy K. Furr, president of the company said. "Within four days, most of the stock had been replenished and the only things still marked were the slower moving ones."

One reason for shoppers' apparent acceptance of the new system, in addition to speedier checkout lane service, is the detailed sales receipt they now get. Store location, date, department identification for each purchase, its price and verbal description, change due, number of trading stamps given, time of day, lane and checker numbers and other information are detailed for the customer.

Shelf price markers are augmented with even bolder tags which draw attention to price reductions and special buys, Robert Green, vice-president of retail operations, noted.

"Yet another plus for the consumer," Green said, "is the system's prepricing for specials. Checkers don't have to memorize these anymore; they're just programmed into the computer before the store opens each day."

Equipment Configuration

The checkout lanes at Furr's No. 1 are equipped with the modular sales terminals with a keyboard and operator display, customer display panel, remote cash drawer and three-station printer.

In the business office at Furr's No. 1 is the dual processor minicomputer which stores all of the prices. The configuration has magnetic drum memory for lookup of up to 13,800 items and a magnetic disk unit for backup. If one unit should ever go down or malfunction for any reason, Green explained, the other would permit checkers to carry on as usual.

Store manager Richard Moseley enters price changes on the computer through a back office NCR 255 terminal. Another 255 is used for checking out checkers at the end of their shifts. UPC labels for items which don't come imprinted by the vendor are also produced in the back office.

What isn't as obvious to customers as the speed and more informative sales receipt of the new system, Green noted, is its inherent accuracy.

"The scanners don't make mistakes," he said. "If an item isn't held properly so the UPC can be read, the operator is alerted because the second light doesn't flash and the item isn't recorded.

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Free Booklet Details Pros, Cons of OCR

By Frank Vaughan
Of the CW Staff

PENNSAUKEN, N.J. — The major force driving DP people to optical character recognition (OCR) and away from keypunch machines and terminals is cost, according to a free booklet from Auerbach Publishers, Inc. — but initial equipment costs are only a small part of the economic story.

"The real savings of OCR come from the elimination of redundant keyboardings of the same data; from eliminating multiple verification steps; from reducing the number of documents needed to complete a transaction; and from the return of data control to its site of origin, where errors can be detected quickly and corrected," Auerbach explained.

The technological advances and range of applications for OCR are described in the portfolio, "OCR Applications," which cites the recent technological advances that have reduced OCR costs significantly.

The booklet also demonstrates how OCR is being used by many industries across a wide spectrum of applications previously reserved for punch-card and other traditional input equipment.

The portfolio describes some of the benefits of OCR, including reduced turnaround time, its use in distributed data processing, the elimination of redundant business forms and reduced employee skills.

Further, it discusses some of the problem areas that have plagued OCR since its conception. The areas discussed include low reliability, lack of font standardization, document preparation problems, overly generalized designs and unrealistic user expectations.

Under the heading of device categories, the booklet briefly describes OCR page readers, mark sense page readers, document readers, OCR wand readers, bar code wand readers, journal tape readers and OCR hybrids.

The differing applications for OCR and some of the specific savings that certain firms have reported since implementing OCR are also examined.

"OCR Applications" is available from Auerbach publishers at 6550 N. Park Drive, Pennsauken, N.J. 08109.

At Five N.J. Data Centers

Hardware Monitoring Effort 'Primitive' But Effective

By Esther Surden
Of the CW Staff

PHILADELPHIA — Although the New Jersey government is in the process of choosing a software monitor, it has had a fairly successful program using a hardware monitor since 1972, according to Carle M. Willims, assistant supervisor, Bureau of DP Management, New Jersey Department of the Treasury.

Speaking at a Computer Caravan workshop on measuring system utilization, Williams admitted "our whole monitoring program is really kind of primitive," but he thought other users could profit from the state's experience.

The state operates five major data centers that use medium- to large-scale IBM CPUs in a wide variety of equipment configurations and operating environments, he said. The bureau supervises such areas as budgeting, supplies, outside services, specification writing and feasibility studies. It also runs a performance measurement program.

"Performance," Williams said, "is a word that doesn't mean anything unless you have something to measure it by."

Variety of Chores

The department uses a Comten Dynaprobe D-7900 hardware monitor to perform from six to nine monitoring assignments each year, either at the request of a data center or on its own initiative, he said. The monitor is used to assist in capacity planning, RFP preparation, system tuning, evaluation of requests for new equipment and analysis of various problems, he stated.

It is also used in before/after analysis to determine if the objectives of an equipment upgrade have been met, he said.

The monitor used is not a stored program device. It has 16 digits counters, a 12-bit multifunction register and the capability to attach 32 probes to selected points.

It can count, time and sample occurrences by detecting and recording voltage amplitude or polarity changes which exceed a preset threshold, he noted.

Software associated with the monitor allows the system to manipulate the data and produce reports.

At the beginning of each project the objectives of the study are defined and a monitor configuration is designed to collect the right data.

The monitor is prechecked before the installation and the department installs all the probes itself. A test is run to make sure there were no setup errors or monitor malfunctions and then the monitor is allowed to run — that is, if it is not stopped by a wary data center manager who thinks the monitor is causing the unexplained problem that just popped up in the CPU, Williams said. Sometimes problems such as this can delay an assignment by weeks, he added.

Because of the limitations of the hardware monitor some jobs have to be broken down into several parts, with each part requiring changes to the plugboard or resetting probes, he said.

After the test is completed, the department moves on to the next site noted in a quarterly plan. The information gathered is shown to the center manager to review the results before a formal report is written. Assignments are often overlapped, he said.

One of the most frustrating difficulties Williams faces is the rapid turnover of people who know how to perform the monitoring jobs. It is difficult to have to train people all the time, he said.

Another problem is the physical limitation of the hardware monitor itself. "Its mapping capability is very poor compared to what we want it to do," he said.

It is also "an effort" to get the data center management involved in the study, he stated. "They tend to see us as spies."

"And it also seems that we spend a lot more time performing the tests than the results created warrant. We want to make our time more productive," Williams said.

(Continued on Page 97)

COM Processor Family Employs Laser

NEW YORK — A family of computer output microfilm (COM) processors that employ a laser imaging system to print computer data at 2.5 page/sec onto dry, heat-processed microfilm has been introduced here by Eastman Kodak Co.

The units, the Kodak Komstar 100, 200 and 300 microimage processors, combine both imaging and processing functions for 105mm microfiche and 16mm microfilm in a single unit. The Komstar processors deliver processed fiche in a single pass through the unit, according to the firm.

The units manipulate a laser beam to expose the characters in a 7 by 9 point matrix. The beam is split into a fan of nine sections and writes an entire column of the character matrix at a time, a spokesman explained.

The beam is then moved from character to character until a single line is written. Following the completion of a line, the beam skips to the next line and writes, continuing in this manner until the entire page is written.

The laser writes with an effective speed of 10,000- to 20,000 char./sec with a resulting output of 2.5 page/-sec, the spokesman said.

The dry-process Recordak Dacomatic DL SO-030 film introduced with the COM processors will be available in 16mm and 105mm widths in roomlight-loading cartridges. The film is capable of 1,000 line/in. resolution, he claimed.

The Komstar 300, the first of the three processors to be released, is an intelligent, off-line tape-operated COM unit that does not impact operating systems or job streams, Kodak said. The free-standing unit accepts most magnetic tape print image records from the CPUs of most major vendors.

The unit contains a Komstar 200/300 formatter that can be instructed to structure output in microfiche or roll film formats, the spokesman added.

The Komstar 100 and 200, scheduled for delivery early next year, were designed to be on-line units with IBM 360/370 CPUs. The Komstar 200 can be controlled by Kodak Starlink III software or that of the IBM mainframe; the Komstar 100 can be controlled by Starlink I or II software.

The 100 sells for $109,125, the 200 for $128,925 and the 300 for $143,225, the firm said. Kodak is at 343 State St., Rochester, N.Y. 14650.

Protecting the DP Center — Part 1

Full Security Plan as Basic as Equipment Selection

By Irving M. Crupar
Special to Computerworld

Much has been written on the procedural steps required before installing computers and related DP equipment. These embrace selection of proper equipment, checking and planning for areas to receive the equipment, utility requirements, orientation and training of personnel and provisions for expansion of the initial facility. But equally important is the assurance of uninterrupted operation of the system, since partial or entire loss of equipment can paralyze an entire operation, even if the interruption is only temporary.

This is the first of a four-part series on physical security of the computer center by Irving M. Crupar of the Wackenhut Corp. The series is extracted from a chapter in the Automatic Data Processing Handbook, *copyright 1974 by McGraw-Hill, Inc.*

This week, Crupar discusses the need for security systems and looks at access entry systems. He also examines how the William J. Burns International Detective Agency, Inc. approaches security for its computer facilities.

Next week Crupar provides a fire protection checklist and in later weeks will examine detection devices and standby procedures.

A computer represents a large capital outlay or rental commitment and a continuing heavy operating expense commitment. Thus, when companies consider this form of purchase, they usually make careful studies to determine whether the machinery is really necessary and whether it will accomplish the desired objectives.

Equally careful studies should be conducted to assure that after the computer is installed it will be capable of working 365 days a year, 24 hours a day, if necessary, and is secure from any danger such as theft, fire or vandalism.

Wrong View Taken

DP managers often make the mistake of viewing security as they would the security of their homes, without taking into consideration the full business risks involved in loss of vital information over and above the cost of destroyed or damaged physical equipment. They forget that destroyed computer centers have set businesses back years and have driven others completely out of business.

In this connection, security from intrusion or inside sabotage is perhaps even more important than protection against damage from storm or fire. It is possible for an individual with an inexpensive magnet, given enough time, to completely erase the information contained on reels of tape.

The obvious areas that must be considered with respect to the degree of security to be applied to the computer center are

(Continued on Page 98)

Halt! Who Goes There?

A visit to the headquarters of the William J. Burns International Detective Agency, Inc., at Briarcliff Manor, N.Y., provides the visitor a "real life" demonstration of complete physical computer security. The company utilizes its own computer installation, used for its 30,000-employee payroll and general accounting and sales analysis, as a working example of the electronic security package it has been installing and servicing for the past two and a half years.

The computer area is on the first floor in a separate building adjacent to the headquarters erected in this "exurbia" setting. Because the installation is on the first floor of a structure in a fairly secluded area, the Burns controller requested maximum security. Designing it led to the idea of making it a security "demonstration model," representing the ultimate from which a computer user can make customized adaptations for his own needs.

Protection begins with a perimeter defense of the building itself, with burglar alarm wiring on every door and window. All windows are bulletproof. Any unauthorized attempt to enter the building would trigger a response at the guard position at the Briarcliff Manor location and in White Plains, N.Y., the nearest of the central control stations Burns maintains in 21 cities. At the central stations, signals from warning devices are monitored on a 24-hour basis.

In addition to personal response, public police and fire units are notified immediately. As soon as a person enters the building after hours, his motion is detected by ultrasonic detectors. These operate independently of the perimeter warning system and also signal the local guard force and the control station in White Plains.

To enter the DP area, one must pass through two maximum-security doors, both operated by a card reader. The first door accesses the DP area as a whole, but not the mainframe computer room. In this general area, work such as systems design, programming and keypunching is done.

The ID cards for employees here (of course, all employees receive thorough security checks) operate the door to their area, but not the second door leading to the computer room. Employees with computer room duties are issued special ID cards which operate both doors.

In addition to these employees, only the DP manager, the head of administration services and the controller have "double" cards.

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When it comes down to who has the small computers with the fastest COBOL, our commercial ECLIPSE systems speak for themselves. And since we give you a computer that talks fast, our people don't have to give you a lot of fast talk.

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Key-to-Disk Helps Blend Central, Regional Control

By Bill Orr
Special to Computerworld

Management philosophies and operating methods in the heavily regulated, multimegabuck insurance industry don't usually change much, or often or fast. So in 1973, when various statistical reporting agencies redefined their requirements for the insurance industry, the implementation date was set a seemingly comfortable several years in the future.

Now, with 1978 bearing down on them, insurance firms are putting into place the necessary changes in their DP systems.

One major firm, Safeco Corp. of Seattle, turned the necessity into an opportunity to upgrade its entire nationwide data entry and processing network. Some highlights:

- Data entry at regional profit centers was changed from keypunching to key-to-disk methods, reducing production costs and giving regional centers better tools for controlling the all-important balancing function.
- Data communications was liberated from a print-speed straightjacket, several Wats lines were eliminated and communications times were cut in half.
- Remote printing at regional centers was changed from on-line control through IBM 360/20s to off-line control by the local key-to-disk systems.

The multifunction key-to-disk systems are the centerpieces of the new approach, according to Irvin H. Meyers, director of operations. Meyers' three-person group coordinated the procedural, hardware and programming changes. They interfaced with headquarters staff, regional managers, corporate DP and equipment vendors to be sure everybody was comfortable with the way the system was evolving.

The decision to switch from keypunching to key-to-disk was never really in doubt, Meyers recalled.

"The 80- column record was simply too limiting for the amount of statistical data both the reporting agencies and our own management wanted," he said. "And we knew we needed more than a plain vanilla key-to-disk system. So we only looked at systems which were capable of performing the roles of data entry, remote batch processing, and teleprocessing."

Tough System Specifications

Safeco laid down some tough system requirements;

- Ability to adapt to Safeco's unorthodox Btam communications system.
- Ability of the remote systems to receive data from Seattle's computer center in an unattended mode.
- High-quality, fairly high-speed printing that is off-line to the computer center's host 370/168.
- Concurrent keying, high-volume printing and teleprocessing.

After a one-year study, Safeco made its decision to go with General Computer Systems in mid-1974.

"The GCS 2100 system was the only one we looked at that we felt sure could do the job," Meyers said.

The first systems, with the necessary customizing, were installed four months later. The last of the 15 regional centers was converted in March 1977. In all, 171 keypunches and verifiers were replaced with 147 keystations. The work of the 15 Model 20s was assumed by the GCS 2100's controllers. Two Wats lines were eliminated. The total number of key operators was reduced from 151 to 139.

While cost-saving was not the governing motivation for the change, Meyers estimated that the GCS system is costing about 10% less than the old combination of keypunching and on-line printing.

Safeco's new system implements a long-standing management philosophy that blends central and regional control. Corporate headquarters controls DP methods and hardware. Regional centers control data entry, balancing and customer relations.

This DP philosophy grows naturally out of the way the corporation works. Last year, Safeco's 6,000 independent agents wrote some 2.5 million property and casualty insurance policies worth an aggregate of more than half a billion dollars. All of these policies — including changes, updates and claims — were serviced at the 15 regional centers.

The current system affects nearly every operation in the DP cycle.

A new policy — or a change to an existing one — originates with an agent in the field. He fills out the application, including hand-calculated rates (for new business only) and mails the information to the regional center. A premium payment may be included.

At the regional center, operators assign policy numbers and create batches containing premium detail and payment information on different types of policies. A total of 203 different types of policies can be involved in a day's work. Inputs are automatically batched as they are keyed. A batch-balancing record contains the number of records in the batch and the total dollar amount being forwarded.

Those two numbers will have been checked four times before the printed policy is sent to the insured. GCS developed over 100 data control programs to handle the various kinds of policies,

(Continued on Page 95)

Data Logger Uses Cassettes

NEWTON UPPER FALLS, Mass. — Memodyne Corp. here has a 16-channel data logger that utilizes standard Philips cassettes as a storage medium.

The unit has a 50 bit/sec data rate and can store up to 1M bits on a standard 300-foot cassette, a spokesman said.

The unit price is $2,030 and delivery is three weeks from the firm at 385 Elliot St., 02164

Updated Data Entry Ties Central, Regional Interests

(Continued from Page 94)

claims and accounting transactions involved.

One of these programs controls the daily balancing of 90-day history tapes, which are accumulated as backup for the batches transmitted to Seattle.

Every afternoon, Seattle time, all 15 divisions go through a precisely choreographed remote data entry routine. Data from the East Coast comes in earliest. By the end of Seattle's first shift, inputs have arrived from Pacific Coast time zones.

Batches are transferred from GCS 2100 disks through 1,200-character buffers to Wats lines operating under Safeco's modified Btam system.

To adapt its systems to the unique line discipline, GCS had to modify its standard communications control features. This modification might have been all but impossible on orthodox 3780-type remote batch terminals. Fortunately, it was a relatively easy change for GCS to make in the communications controller because of its table-driven programmable microprocessor, Meyers noted.

Before March of this year, incoming data was spooled onto magnetic tapes by a 360/65 in Seattle. Now data goes directly from GCS disk to 168 disks. This boosts input rates by 10% to 20%, Safeco analyst Dennis Quimby estimated.

The 168 works on remotely input data on the second shift, finishing in the early morning in time to send processed batches back to regional centers. Auto and homeowner insurance policies — more than half the total processed — are returned every morning; other types are turned around on a somewhat more tolerant schedule.

Processing boils down to a complex clerical operation: validating rates, claim amounts and number of transactions; preparing a "cash list" for reconciliation of batches; formatting the variable data of individual policies for remote printing at regional centers; segregating the incoming stream of batches into groupings of like policies for corporationwide statistical reporting. This processing involves six major software systems and hundreds of individual programs.

Although nobody at Safeco wants to rule out the possibility that these centralized functions will someday be distributed to the regional centers, the idea doesn't draw much enthusiasm either.

"As we know it today, nothing under several million dollars would duplicate this capability," Bill Deidenhover, technical support analyst said.

In the final processing step, the variable data of individual policies is transmitted to the regional centers, where the actual policies are printed. The data moves from a 168 disk to 15 unattended 29M-byte disks under a unique line discipline.

According to GCS analyst Gene Augsburger, Safeco's modified Btam overcomes some generic Hasp deficiencies that can cause big printing problems under certain conditions. He explained that line hits sometimes cause a printer controller to drop or duplicate data. This kind of error is serious when it results in say, failure to print a check or in printing one twice.

When these error conditions are detected under orthodox Hasp, the system may have no alternative but to start over from the beginning of printing. This could involve two or three hours of unnecessary printing, he noted.

The Safeco modification counts blocks and checks them for an uninterrupted block sequence. When an error condition arises, the system back-pages to the beginning of the form being printed.

Before changing to off-line printing, IBM 1403 printers were on-line with the 168 in Seattle under control of local Model 20s. Every local printer had to be synchronized with the Seattle computer. Transmission was print-bound.

In the present system, policies are printed on 600 line/min Dataprinter units that have chain drives for quality impressions. The GCS printers contain their own vertical forms units for positioning variable policy information on preprinted continuous forms.

Now that Safeco has the last elements of its new system in place, it can go to the 120-column record format needed for new statistical reporting standards.

Meyers foresees no big changes in the Safeco system over the next five years. But he expects to take advantage of the GCS system's virtually unlimited record length and its ability to handle multilevel records.

"Eventually, we'd like to see the agents enter their own data and get on-the-spot validation of policy rates from terminals in their offices," Meyers said.

Orr is an independent marketing consultant from Santa Monica California.

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Standard 4051 features include twenty user definable functions and internal cartridge data storage. Plus, you can choose from a full line of Tektronix interfaces and peripherals to meet your specific needs.

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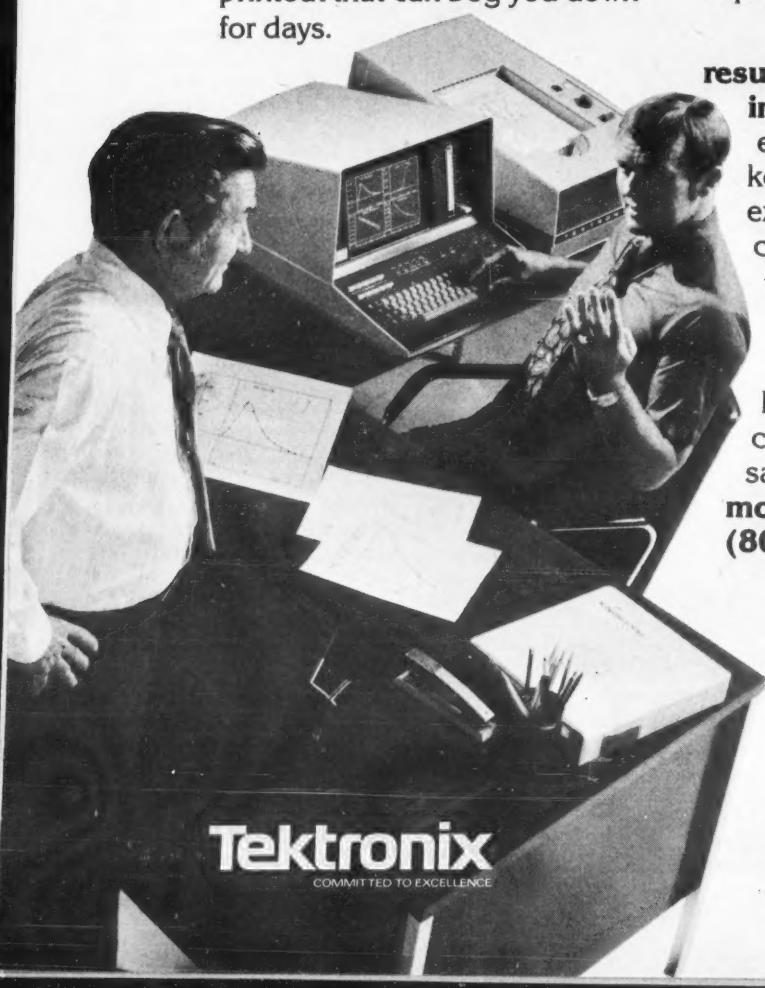

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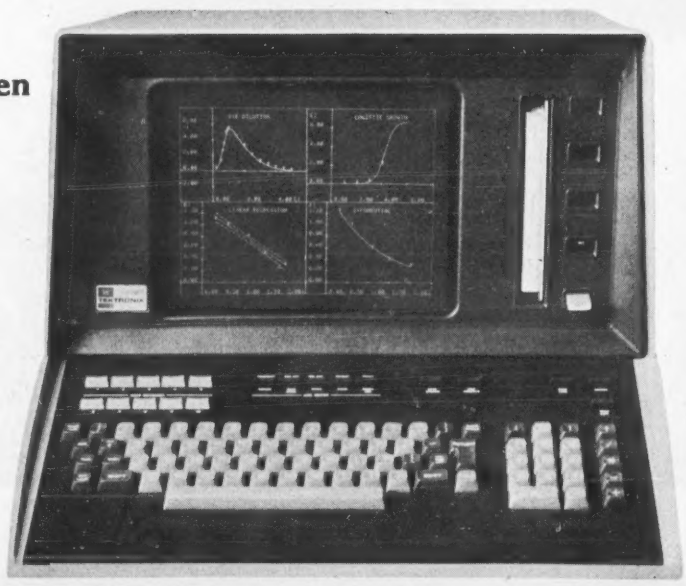

Brochures Describe Product Offerings

Several manufacturers of peripherals and computer-related products are offering free literature on products and services.

• A four-page folder describing the Graf/Pen sonic digitizer, which provides direct graphic input to programmable electronic calculators, is currently available from Science Accessories Corp., 970 Kings Highway W., Southport Conn. 06490.

• ST-1, a tape preparation center for numerical control, is described in a four-color brochure from Manufacturing Data Systems, Inc., 4251 Plymouth Road, Ann Arbor, Mich. 48105. The brochure explains and illustrates the major system capabilities as well as the component hardware.

• Trio Labs, Inc. has a four-page brochure describing the firm's dual, triple and quadruple output switches in the 100 W to 475 W range. Trio is located at 80 Dupont St., Plainview, N.Y. 11803.

• TBM II, a mass storage system, is described in a brochure published by System Development Corp. The brochure compares the performance of the TBM II with conventional tape storage for data base consolidation, file processing and batch applications. It is available from Corporate Relations, System Development Corp., 2500 Colorado Ave., Santa Monica, Calif. 90406.

• An automated information storage and retrieval unit for 105mm roll microfilm is described in a brochure from Information Retrieval Systems Corp. The product bulletin covers the Strobe/-Search 100 and is available from the firm at 444 Park Ave. S, New York, N.Y. 10016.

• A brochure on voice numerical control programming systems is available from Threshold Technology, Inc., 1829 Underwood Blvd., Delran, N.J. 08075.

• Two brochures, "Over 32" and "Underspacemaker," describe air conditioning systems for critical environments such as computer rooms. They are available from Hiross Denco, 6707 Lincoln Ave., Lockport, N.Y. 14094.

• A six-page catalog describing a line of high resolution absolute and incremental rotary optical shaft angle encoders is available from Measurement Systems Division, Itek Corp., 27 Christina St., Newton, Mass. 02161.

Unit Certifies Disk Surfaces

PHOENIX — A self-contained, internally programmed disk surface tester for IBM 3348, 3350 and equivalent magnetic disks and disk substrates has been introduced by Three Phoenix Co.

The unit, the SA-323M disk surface analyzer, provides mechanical certification and evaluation of the disk surface for both 50- and 75- mil substrates as well as magnetic coated memory disks, according to the firms.

Each analyzer is configured according to individual end-user needs. Prices begin at $44,000, Three Phoenix said from 10632 N. 21st Ave., Phoenix, Ariz. 85029.

Monitoring Effort Successful in N.J.

(Continued from Page 91)

Trends toward denser packaging in CPUs in the future are going to make hardware monitors more difficult to use, he noted, because it will be difficult to find places to put the probes. At the same time, vendors should be supplying more performance analysis tools, he said.

With distributed processing, system availability should not be as much of a problem as it is now, and data center managers will not be as upset if the system has to be brought down to initiate the monitoring process, he said.

Williams advised those embarking on a progam to have a plan and make use of outside sources such as meetings, newsletters and other users doing the same thing. "Be sure you know what the data is really telling you," he cautioned. "Then evaluate the program regularly to make adjustments. Don't just get something and keep it like we did for four years," he urged.

Using performance boosters such as data set optimizers is also a good idea, he noted.

CPUs, Related Items Compiled

LEXINGTON, Mass. — GML Corp. here has published its annual *Computer Review*, a reference covering CPUs, peripherals, software operating systems and manufacturers.

Each computer system product is described one per page. The data included consists of a 100-word description, applications of the system, features of the system, characteristics of the CPU, compatible peripherals (cross-indexed with the peripherals appendix), systems software availability (also cross-referenced), software language availability, memory requirements, prices and marketing data.

The peripherals index includes all models referenced in the main section and describes all major characteristics with purchase price.

Operating systems are described two to a page. The data includes a 100-word description, characteristics, prices (cost of package, documentation, training and maintenance) and marketing data (number of users, latest release and installation data).

The last appendix is a listing of the names, addresses and telephone numbers of all manufacturers referenced in the guide.

"*Computer Review*" is available for $75/year and includes updates every four months. GML is located at 594 Marrett Road, 02173.

Full Security Plan Basic to DP Center

(Continued from Page 92)

- How important is the equipment? This evaluation is based both on what the equipment is and what it does. If it controls air traffic safety, it can be vital to human life; if it controls corporate information, it can be vital to business life; but if its loss would be simply an inconvenience, then perhaps it is not especially important, even though it may be expensive.
- Does this equipment need special construction, special access control and fireproofing and fire-detection devices? Where new facilities are to be built for the computer center, it is important that all safe environment factors be considered in the early planning for the structure.
- What are the special exposures of the equipment? Special exposures can exist within the equipment room, in the immediate area around the DP room, in the floors above and below the computer and outside the building in which the equipment is located. These exposures must be evaluated and then eliminated or guarded against as needed.

In Public Eye

At the beginning of the computer boom, most DP installations were put behind glass walls so they could be visible to everyone. This was good public and employer relations. Not only was the installation planned to be totally visible, but, generally, there were no restrictions regarding access to the computer area.

This installation blueprint was satisfactory until some centers were sabotaged — bombed, burned, maliciously damaged — or subject to theft of information by intruders. It was soon obvious that the computer would have to be adequately protected and hidden from public view. Security measures centered around access to the electronic DP centers and the byword was restriction.

Restriction varies from organization to organization, but in general includes a preliminary fingerprinting program and complete background investigation of all computer employees. This procedure is then followed by a strictly enforced system of entry, so that only those designated to work in the area are permitted access.

Access Entry Systems

Access entry systems can be expensive or relatively cheap, according to security needs. For the utmost in simplicity, a doorbell-button arrangement can be used, requiring a person to open the door from the inside after the person requesting entry has been "recognized."

More elaborate and expensive is the card reader, an automatic electronic device which will allow entry only if the appropriate card is inserted. This method requires no attention from the inside. In addition, the card reader can be connected to a printer to record specific information, such as the card reader location (if there is more than one), the person desiring entry and the date and time of the entry.

In 1968, when Burns International Security Services, Inc. installed a DP system at its corporate headquarters building, it made certain the installation was not visible to anyone. A dual card reader system was installed and only six people were issued cards providing entry into the main computer area. Even the president of the company did not receive an access card. (See accompanying box on Page 92.)

Vendors Give Tips On Mini Selection

By Esther Surden
Of the CW Staff

With interest in on-line multiprogramming systems for first-time users affirmed by the introduction of IBM's System 34, various vendors have offered their thoughts on what qualities users should examine before choosing such a system.

The following suggestions were gleaned from interviews with spokesmen from Basic/Four Corp., Datapoint Corp., Qantel Corp., Wang Laboratories, Inc. and from two turnkey system houses — Minicomputer Systems, Inc. and STC Systems, Inc.

Software capabilities were widely mentioned by the vendors as an area first-time users should carefully evaluate.

Many vendors offer a single language for their systems, so the user should make sure the language chosen not only works efficiently for real-time processing, but is easy for the user to grasp.

This can mean the difference between having to hire a programmer to modify application packages and develop new applications and "doing it yourself," one vendor pointed out.

Ease of system operation is another factor, another vendor noted. A system for a first-time user should be able to be operated by existing personnel with a minimum of training. Some vendors even believe the system should run unattended.

Compatibility in a product line that allows users to grow from a very small system to a very powerful one without changing software was also mentioned. This enables users to expand their applications without making another investment in software.

Disk backup should be assessed as to its suitability for each particular business. One vendor stated most DP users need to backup entire disks so as not to take any chances of losing files.

The media used to perform the backup function should be practical and users should make sure their systems offer effective disk backup. However, if the application is primarily a data entry-oriented function, then massive disk backup may not be necessary.

Some systems can handle remote CRTs or workstations while others cannot. And the number of terminals that can be attached to a given system can also be a limiting factor.

If the maximum number of terminals that can be attached is four and you may need five next year, get a system that can accommodate that number now.

Delivery times, available options, pricing and support are, of course, aspects every user should look at. Support, the vendors agreed, is the most nebulous of areas and can only be determined by talking to other users of the prospective vendor's product.

A user in a remote site should check out his vendor's service very carefully, they advised.

Space Simulator's Mini Enriches Learning

By Esther Surden
Of the CW Staff

CLEVELAND — A minicomputer-based Space Transit Simulator is being used at the Cleveland Supplementary Education Center to help enrich the learning experience of this city's school-aged children.

The simulator, developed by Spitz Space Systems in Chadds Ford, Pa., uses dual Data General Corp. minis to perform its "unearthly" job, according to Dr. Leonard Skolnick, vice-president of Spitz.

A smaller noncomputerized version of the planetarium is being featured at the Data General booth at the National Computer Conference in Dallas this week.

The space theater is funded by the Cleveland Board of Education. Like the other programs run at the center, it is designed to give kids "a day they cannot get back at school" and also to let them meet children "of different backgrounds," according to Walter Mueller, a member of the center's space theatre staff.

Spitz decided to develop a computerized planetarium with an analog system about 20 years ago when "the observers of the simulated sky would no longer accept an earth-bound limitation," Skolnick explained.

A system similar to this space transit simulator is in operation at the Data General Corp. booth at the National Computer Conference this week.

The first of its efforts with a digital system began about 10 years ago using Digital Equipment Corp. equipment, but the designers soon switched from that vendor to DG because "we needed a dual processor for reliability and speed," he said.

"Basically, it was a price question and DG equipment was more competitive price-wise.

"Also, our programming people were more familiar with DG's operating system than with DEC's," he added.

The space theater uses dual DG Nova 2/10 minis, each with 32K words of core memory and a moving head disk subsystem. Other peripherals include an alphanumeric CRT terminal, two specialized floating-point processors and a Spitz-designed control console that ties projectors, lighting, sound and special effects equipment together.

(Continued on Page 103)

Dataram Offers Bulk Core Unit As Fixed-Head Disk Alternative

CRANBURY, N.J. — Dataram Corp.'s Bulk Core is an electronic alternative to fixed-head disks that can be interfaced to Digital Equipment Corp. and Data General Corp. minicomputers, according to the vendor.

The Bulk Core memory is mounted in a 15-3/4-in. high rack-mountable chassis that can hold up to eight 128K-word modules for a maximum capacity of 2M bytes, the firm said. The chassis contains an interface, power supply and fan assembly.

The interface for the unit is microprocessor-controlled, according to a spokesman. Access time is 750 nsec for the BC-201, which emulates DEC's RC-11/-RS0-64 disk systems, and the BC202, which is equivalent to the DEC RF-11/RS-11.

The BC-301, which emulates the DG 4019 controller and Novadisk, features a 2-msec access time.

The access times for Bulk Core are at least 5,000 times faster than the access times of comparable fixed-head disk systems offered by the mini makers, the firm claimed.

The system features parity generate-and-check, built-in off-line test capability and operational fault indication.

Intermediate Storage Device

The unit can be used to replace a swapping disk as an intermediate storage device between main memory and a moving head disk, the vendor said, or it can be used as a multiprocessor shared memory.

The Bulk Core system with the appropriate disk-compatible interface costs $9,700 for 128K words and includes a one-year warranty.

Dataram is located at Princeton-Hightstown Road, Cranbury, N.J. 08512.

Oil Distributor Replaces IBM 3, Increases Processing Sixfold

By Esther Surden
Of the CW Staff

WICHITA, Kan. — Universal Motor Oils, Inc. here has increased its processing throughput sixfold after replacing its IBM 3/10 with a Hewlett-Packard Co. minicomputer, according to Dennis Lamb, DP manager.

The firm switched to the HP system about eight months ago because "we wanted an on-line, interactive system that could also run our batch programs," Lamb said. "We had no qualms about the IBM gear; it's just not the machine we needed."

Prior to going with the HP system, the firm looked at systems from Digital Equipment Corp. and Burroughs Corp. "DEC takes a casual attitude in these matters," Lamb said. "They'd like to send you a purchase order and then mail you a machine."

The Burroughs systems would have fulfilled the firm's needs except "we weren't convinced because it is not a true time-sharing system," he added.

The system finally selected, an HP 3000-II, was a bit more than the company needed, Lamb indicated, so the firm is presently selling time to other users in addition to running its own business applications on it.

All the batch programs previously run on the IBM 3 have been transferred to the system, Lamb said. The RPG on the system was similar to that on the IBM.

"We had some problems with the HP Rsam which is HP's answer to IBM's Isam," he said. "But since that time, HP introduced Ksam and that wound up solving all of our problems."

Presently, only such accounting applica-

(Continued on Page 103)

With Rise of Minis

Interactive DP More 'Affordable'

By Esther Surden
Of the CW Staff

NEW HAVEN, Conn. — "Every user of computing has always wanted interactive processing, but at an affordable price." Maxicomputers have offered it, but "clumsily and at a high price," according to David W. Chaffin, president of Applied Data Processing, Inc.

Now users can have interactive processing through the use of minicomputers and often at a price well below that of batch processing on a maxi, he told an audience at a recent conference here.

Speaking on how to select a minicomputer for business applications, Chaffin told a group of about 100 session attendees that although it's difficult to offer an exact definition of a minicomputer, generally minis are small in size, low in price and fundamentally designed for interactive processing.

"Many if not most minis will run in batch mode, but I don't think you get the most benefits out of a mini when you use it that way."

Interactive processing permits the control of the source documents to be placed in the source departments. When such key fields as customer name and employee name are displayed on a CRT, the user can see if the right name has been entered.

With batch mode, user departments enter data on source documents, then the document goes through to a keypuncher, verifier, someone who corrects errors and a reprocessing department so print control totals can be printed, he said.

Obviously, entering data at the source means the people who enter the data know the nature of the data, he said. Entering data at the source using clerks is also cost-effective, he said, since keypunch operators and clerks have different pay rates.

Minis also offer inquiry features, an advantage over batch systems which may only show reports as of last month.

Programming Efficiencies

An interactive system also has benefits in programmer efficiency — an area much overlooked, Chaffin said. In batch mode, the programmer can't see the results of his work until much later. In the meantime, the programmer probably has been working on three other programs.

With minis, the programmer can enter code and find out right away if there are syntax or other single instruction errors, he said.

The bottom line on minis, he added, "is that they can do a far better job than maxis and save 25% to 75% of the money being spent for maxi equipment and people."

Minis consist of three parts — the operating system software, application software and the hardware, he said. "The first two parts, I submit, are more important than the hardware," Chaffin asserted.

Minis range from systems with 2K bytes of main memory to systems with 10M bytes.

Disk storage can range from a fraction of a megabyte to a billion bytes, he said.

Printers on minis can be anywhere from 10 char./sec to 1,200 line/min, while most CRTs can handle 1,920 characters. In fact, "the capability of a mini ranges from something just above what you'd give your kid to a very powerful machine," he said.

Although Chaffin does not believe that mainframes are no longer useful, he noted that "most of us don't have enough numbers to crunch to require something like that. What most of us do have is a certain measurable requirement for input and output, which can be handled by using an interactive method, and a measurable need for files."

For most applications, minis will replace maxis, he predicted. However, that may not happen for many years, he said, because of inertia, disbelief that such a small piece of hardware can do such a big job and the problems of conversion.

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THE DATAPOINT 6600--

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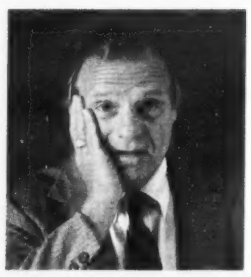
For Network Planners It's a Disturbing System



The Datapoint 6600 is indeed a disturbing system. Because it will change the way computer network planners now think about "small" computer systems.

True, the 6600 is small physically, like the Datapoint computers that have come before it. But it is equipped with the latest technology, including features like 120K user memory, and can support up to 24 independently-functioning video display terminals in a true timesharing mode. In fact, the Datapoint 6600 packs the processing wallop of many of today's large-scale computers, at a fraction of their cost.

When combined with Datapoint's wide range of peripheral equipment, such as the new 20-megabyte disk drive, the 6600 can be used to produce a variety of disturbingly capable systems. It will free network designers from many of the constraints that previously bound them. With the 6600, regional centers can remove a major processing burden from the central mainframe computer while boosting the efficiency of local operations. In fact, a well-planned dispersed processing network can in many cases eliminate "mainframe inflation" altogether.

Like other Datapoint dispersed processors, the 6600 functions well in a stand-alone mode. It has the speed and power to handle 24 different user programs simultaneously, or to run batch jobs in COBOL, BASIC and RPG II. And with communications capabilities always available, a stand-alone 6600 can be converted almost instantly into a functioning node in a dispersed processing network.

In truth, the 6600 is a disturbing system because it will challenge your present assumptions about what a small computer can do for your operation.

Accept the challenge. Study the Datapoint 6600 in detail. Compare it with the competition. Look at the carefully planned sequence of compatible Datapoint hardware and software products which have preceded it. We think you'll come to the conclusion that the 6600 has more to offer than any comparable system now on the market.

For more information on the 6600, contact the Datapoint sales office nearest you, or write Datapoint Corporation, attention: Product Marketing, 9725 Datapoint Drive, San Antonio, Texas 78284 (512) 690-7151.

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Raytheon Doubles Disk on PTS/1200

NORWOOD, Mass.— Raytheon Data Systems Co. has doubled the disk storage capacity of its PTS/1200 family of distributed processing systems and added a tape drive to that product line.

The disk subsystem is said to lower the cost of storage for the PTS/1200 by nearly 50% while increasing capacity from 20M bytes to 40M bytes.

The subsystem includes a controller and as many as four dual disk drives. Each drive includes one 5.12M-byte fixed disk and one 5.12M-byte removable disk cartridge. Raytheon offers the subsystem in 20M-, 30M- and 40M-byte configurations.

The drives complement a previously available 2.5M-byte disk drive but feature faster average access times — 33 msec compared with 100 msec for the earlier units, Raytheon stated. The drives have average transfer rates of 256K byte/sec.

Although prices for the subsystem are bundled into the price of the product, Raytheon said a 64K processor with 20M bytes of the new disk costs $45,950, while the same system with 20M of the old disk previously cost $84,020.

The firm also introduced a 37.5 in./sec, 9-track, 800 bit/in. tape drive for use on the PTS/1200 system.

A single drive with controller costs $11,000 or rents for $567/mo including maintenance on a one-year contract. The controller can handle two additional tape drives that cost $7,000 to buy or $366/mo each on a one-year contract, the company added from 1415 Boston Providence Turnpike, Norwood, Mass. 02062.

Interdata Cuts Core, 7/32 Prices

OCEANPORT, N.J. — Interdata, Inc. has lowered prices up to 35% for its memory systems and 32-bit processor, the Model 7/32CII.

The reduced prices are effective immediately and are a direct result of improved core memory technology and manufacturing economies.

Interdata packages 64K bytes of 750 nsec memory on a single 15 in. by 15 in. printed circuit board for $6,500. A parity option costs an additional $500. Previously, two 32K byte memory boards, costing a total of $9,000, were required for 64K bytes of storage, the firm said.

The new processor prices are $17,800 for the end user-oriented processor, down from $27,350, and $11,695 for the OEM 7/32CII, down from $14,850.

The end-user system includes 128K bytes of memory, power supply, chassis and a hardware memory access controller. The OEM version includes 64K bytes of memory, power supply and chassis.

Interdata is located at 2 Crescent Place, Oceanport, N.J. 07757.

DR-114 Expands PDP-11 Memory

CRANBURY, N.J. — A single-board 32K by 18 bit core memory system with optional accessories for main memory expansion of Digital Equipment Corp.'s PDP-11/04 and 11/34 minicomputers has been introduced by Dataram Corp.

The DR-114 system is available in 16K by 18 or 32K by 18 configurations and is plug-compatible with DEC's MMll-D and MMll-DP single-board systems, the firm said.

In addition, Dataram is offering system units to house extra DR-114 systems if unused slots are not available in the host PDP-11 mini. The system unit which occupies nine PDP-11 connector slots can hold four DR-114 systems providing a maximum capacity of 128K by 18, Dataram said.

DR-114 cycle time is 900 nsec and access time is 350 nsec. The 32K by 18 DR-114 costs $3,475 and the 16K by 18 version costs $2,045 from Dataram, Princeton-Hightstown Road, Cranbury, N.J. 08512.

Lessor Has Printer For Datapoint Users

LAGUNA HILLS, Calif. — D&O Leasing Co. has added a fully buffered printer/plotter combination to its line of peripheral alternatives for Datapoint Corp. processors.

The Printronix 300 line printer is fully compatible with any Datapoint software printer package, the company claimed. The unit has a 96-character set and handles up to eight part forms, the company said.

The printer is rated at 300 line/min at 132 columns. Characters of any shape or size, in any position on a sheet, can be printed on computer command, the firm reported.

The unit costs $5,914 from the firm at 23011 Moulton Pkwy. E-6, Laguna Hills, Calif. 92653.

Firm's Mini Increases Throughput

(Continued from Page 99)

tions as accounts receivable and payable are on the system. "We are working on an on-line order entry system along with inventory," he noted.

More People Participation

"We wanted to get more widespread participation of our employees in DP," Lamb said. "For one thing, we expect to speed up our operations immensely by going on-line.

"We can bypass keypunching and do all the input and editing at the terminal. Also, we feel our employees will be more receptive to DP if they have a greater hand in it themselves," he explained.

The on-line order entry system is currently being programmed for the HP system.

Now the firm "doesn't send out an invoice until anywhere from a week to 12 days after we receive the order.

"When this system is operating, we are going to have an invoice in the mail on the day the order is shipped or the next day at the latest," he predicted.

The data base management system on the mini should enable the company to draw information from the order entry system, which will aid in inventory control and in determining production requirements.

"We should be able to retrieve information showing how many orders we need to fill, determine how many barrels or cases of a particular kind of oil we need to fill them and determine exactly what we have on-hand in the warehouse," Lamb said.

Presently, inventory lists run at least three days behind actual conditions. "We believe real-time inventory control will enable us to reduce our inventory overhead by letting us see more clearly what our stock requirements are," he added.

The system at Universal has 192K bytes of memory, two 47M-byte disk drives, a 15M-byte system disk, a 600 line/min printer and four HP 2640 terminals. The firm also has some keypunch equipment.

Micro Features IBM Compatibility

SANTA CLARA, Calif. — The Sord SMP 30/50 is a microcomputer that is compatible on the RPG-II compiler level with the IBM System 32 and System 3, according to its distributor Technical Marketing International.

The system was designed for OEMs, small business system users who need a computer to do a stand-alone task to offload an existing IBM system; or users who will run all their business applications on the system, according to a spokesman.

Two compilers, in addition to RPG-II, are available, he added.

The two compilers are Focal, which is said to "provide the interface for business, scientific and conversational" operation, and Ubol, a language that reportedly implements the fundamental functions of Cobol.

Two disk operating systems, one for floppies and one for hard disk, are available for the system.

The system also has a data communications software package to interface with IBM's 370 via Hasp, RJE or Btam, the firm said.

Peripherals that can be attached to the micro include a Teletype Corp. ASR-33 keyboard CRT, keyboard printer, paper tape reader, paper tape punch, serial printer, line printer, floppy disk and a data communications controller.

The system, which has been available in Japan for over a year, can accommodate memory ranging from 4K- to 64K bytes in combinations of random-access and programmable read-only memory, the firm noted.

A typical configuration with 48K bytes of memory, dual floppy disk drive and a printer/keyboard device costs $13,000, the spokesman said from 309 Laurelwood Road, Suite 9, Santa Clara, Calif. 95050.

Plantarium's Mini Enriches Education

(Continued from Page 99)

System programs were written by Cogit Systems, Inc. of Princeton, N.J., and run under DG's real-time disk operating system. Astronomical calculations and screen format structures are performed in Fortran while the real-time system control and data handling is done in DG Assembly language.

Various Vantage Points

Traditional planetariums assumed the observer's position to be that of the earth, which made the problem of planetary motion simple, Skolnick explained.

The computerized system allows the observer to take a tour of the solar system with the audience experiencing the views from various vantage points, he said.

For example, under program control, the sun projector would allow the moon to shrink in size as the observer moved away. Or, the voyage might end with the observer traveling "above" the solar system, he added.

The system takes care of the astronomical functions and continuously computes the accuracy of the various positions for a specific date, observer position and orientation and relates the projected results to a location on the domed screen, Skolnick stated.

Continuous readout on the CRT keeps track of changes in conditions to show the passage of time or change in observer orientation and position, he said.

Console Most Intriguing

Skolnick believes the control console that operates through the computer is the most intriguing part of the system.

The console allows the show to be built and recorded by event until a complete sequence is established, Skolnick said. Sequences can be deleted, diminished or expanded within the show without editing the master record.

The program creator can see, in real-time, the effect of the simulation being generated, he noted.

The Cleveland education center opened its space theater a "little over a month ago," Mueller said. Because starting with any system is a slow procedure, "we are only taking fourth and sixth grades at the moment," he added.

"I am not a computer person and neither are most people here," he noted. "I am using a language that is familiar to me."

"We are still in a learning experience and great possibilities exist for the system," Mueller said. "We had workshops at Chadds Ford to learn the system but, even with those, we are still unfamiliar with it. After all, we are only the second one in the world, with the first one in San Diego," he noted.

The San Diego version uses DEC equipment, Skolnick added. It was installed in 1973.

Minis Suited to Distributed 'Style of Management'

By Esther Surden
Of the CW Staff

NEW HAVEN, Conn. — Distributed processing is a "style of management" in which all users have control of the resources in their own organization, Pat Mullen, marketing manager of the business products group at Digital Equipment Corp., said at a recent conference here.

Speaking about DEC's view of distributed processing, Mullen said that minis are especially suited for use in networks because "a minicomputer is something that works for less than the minimum wage" and thus is cost-effective for this application.

The various terms associated with distributed processing deserve some differentiation, he noted.

For example, in a centralized system control is very important, he explained. A distributed dedicated system is one in which the systems do only a couple of functions which are a small part of the overall DP requirements.

Dispersed usually means a dedicated machine that is replicated throughout an organization, while distributed data processing means the distributed systems do a high degree of the DP throughout an organization, he said.

Distributed also implies the passing of some information from one computer to another. "It can be as simple as mailing a floppy or exchanging a mag tape," he said.

Mullen said data in any organization can be broken down into three types.

Transaction-oriented data is kept in a master file and users frequently check against this file. Minis perform transaction processing very well and many users like to take this kind of operation of a mainframe, he noted.

The second kind of data is operational data which includes information about the product on a piece by piece, hour by hour basis. Strategic data, on the other hand, is summary-type information that "cares less about how much of number 4 corrugated was produced and more about how many dollars over 90 days is the receivables file."

Close to Home

Distributed processing is becoming more popular due to something Mullen called the"80/20" rule, an axiom developed by one of DEC's customers. Looking around his office, the customer told Mullen that 80% of the information he needs to perform his job is either on his desk or close to it. "Only 20% of the time will I generate data that will go to a central site or be retrieved from it," he told him. The same principle applies to computing, Mullen noted. Distributed processing makes sense because it puts the user's data in reach of the user.

A major benefit of distributed processing is quicker problem solution, he added. "The faster you achieve the solution the faster you are making some capital gains," he told the group. Minis provide the solutions because they were designed from the ground up to be interactive, he stated.

Also, centralization forces the user to conform to an average solution, he said. With decentralization the user is involved in the solution and is motivated to make the process successful.

Distributed processing provides advantages to the managers at the central site, he added. The user sends in corrected data, not errors, and only transmits when he needs to, therefore "shrinking the size of the teleprocessing pipeline" and reducing costs, he noted.

Reliability of the systems does become a problem when dealing with distributed processing. "We've spent a lot of time with auditing firms because they are scared stiff of on-line systems," he said.

Mullen then cited some typical applications that have followed the distributed path.

One user who had a Honeywell mainframe distributed the processing because expanding the large-scale system would have meant high costs and troublesome communications to outlets located in remote areas.

The firm found just one application — tracking wastes — to justify the installation of minis at 26 outlets and used 2780 emulation to communicate back to the Honeywell mainframe. The firm then began to install other applications on the system.

The lessons learned by this user can be applied to all those considering distributed processing, Mullen advised. "Look for a quick return on your investment."

Floppy Disk System Includes DEC LSI-11

WALTHAM, Mass. — The Micro-Flop 11 (MF-11) from Charles River Data Systems is a dual floppy disk system with a built-in Digital Equipment Corp. LSI-11 processor. The entire system is housed in a 10-1/2-in. enclosure, the firm said.

The controller/interface card with the system provides total software and media compatibility between the LSI-11 and the dual floppy disk system, the company claimed.

The MF-11 can be purchased with LSI processor included or the user may install his own LSI-11 within the enclosure, the company said.

The enclosure uses 10 1/2 in. of panel height and houses two floppy disk drives with controller, power supply, slides for rack mounting and the DEC H9270 back panel, the firm noted.

MF-11 uses the Shugart SA800 single-sided drive with the SA850 double-sided drive offered as an option. This provides the user with storage capacity up to 1M bytes of random access disk.

Each diskette is preformatted to the IBM 3740 standard, thus allowing use in other RX-11 floppy disk systems.

The MF-11 without the LSI processor costs $3,350. The same system with the LSI-11 included costs $4,290, the firm said from 235 Bear Hill Road, Waltham, Mass. 02154.

Informs Passengers, Airlines

Mini-Based CRT Net Keeps Airport Flying Smoothly

Special to Computerworld

AMSTERDAM — A network of minicomputers connected to over 200 CRT terminals is keeping both passengers and airline personnel informed of flight conditions at Schiphol Airport here.

A great variety of information is needed by passengers and people connected with the airlines, L.J. Visseren, DP manager, explained.

Passengers want to know which plane to catch, whether food will be available on their flight and whether their baggage will be waiting. Pilots, on the other hand, need to know where to off-load passengers. Airline personnel need to know if the plane is on time and what to do if it is not and customs, police and health authorities all demand information each time a plane leaves or arrives, he said.

To provide this information the DP department decided to develop a dual system which they named Info '75. This would consist of a centralized information system and a public information system which would provide the airport personnel with the essential information on arrivals and departures of the aircraft.

Cost was an important factor, Visseren said. It was for this reason that a network of minicomputers was chosen rather than the traditional mainframe way. From a group of several suppliers which included Digital Equipment Corp. and Hewlett-Packard, Data General was chosen because of its support and software capability, he said. Intersystem, a software house, was commissioned to design and implement the system.

Clustered Terminals

At the airport clusters of CRTs and "split flap" information boards detail the latest information on flight arrivals and departures.

The transmission of information is coordinated by the central information system which collects and updates information for the visual display units.

At the heart of the central information system are two Data General Nova 840 minicomputers. Their job is to maintain a flow of communication between the airport authority and the aircraft handling companies — the organizations that are responsible for the aircraft's needs while it is at the airport.

The system receives its information through interactive display terminals installed where the data originates: the four aircraft handling companies, air traffic control with a direct link from its own computer and the apron control tower, Visseren stated.

The terminal input from these centers is primarily regarded as an updating function to the basic data on flight plans which is fed into the system the day before by magnetic tape or punched paper tape, he noted. Also fed into the system is the aircraft turnaround schedule based on flight plans as well as the aircraft gate position assignment schedule.

Updates Processed

During the day, updates from all the centers are processed interactively, he said. As soon as a deviation from the original plan occurs, messages are sent from the minis to the terminals of the parties involved.

In addition, an up-to-the-minute review of expected incoming and outgoing flights is kept by the system which, in turn, automatically feeds this information into the public information system, he added.

The public information system is based on two Nova 1220 minicomputers. Data for the incoming 24 hours of operation is held on disk in the system, along with the latest information which is continuously fed to the public over 30 groups of four monitors located throughout the airport, and on to split flap display boards which also detail flight times and arrivals, Visseren explained.

The location of these output units was chosen in such a way that the departing passenger on his way through the building encounters guidance at least three times and once more as he goes through the departure gate, he said.

A question the airport grappled with when contemplating the design of this system was whether minicomputers could support such a large number of interactive terminals, Visseren noted. To eliminate any potential problems, Intersystems, the software company, wrote a special software system in Fortran that runs under DG's operating system RDOS.

At Schiphol the systems operate 24 hours a day and uptime is an acceptable 97%. The DP department decided that to go for a higher uptime figure would only increase the cost disproportionately.

The system, in addition to providing the central and public information service, also runs in batch mode for statistical purposes and provides raw administrative data which is fed via a remote job entry terminal link to a bureau for management reports.

In terms of the future, the DP department now plans to extend the use of the system to provide solutions to problems rather than just information. It will answer 'what if?' questions such as to which gate should a pilot take his plane to unload if the one designated has already been taken because of an early arrival.

HP 9825 Calculator, HI Plotters Linked

AUSTIN, Texas — Houston Instruments is offering an interface to link its plotters with the Hewlett-Packard HP 9825 calculator.

The PTC-5A microprocessor interface implements hardware vector and character generation to reduce the time on the 9825 to a minimum, the firm claimed. The plotter interface attaches to the HP 98036A serial interface and can be driven at 300 or 1,200 bit/sec, the firm said.

Software is also available from Houston Instruments on cassettes along with complete documentation. Total memory needed for the package is approximately 4K bytes.

The unit costs $1,945 and the software costs $100 from the firm at One Houston Square, Austin, Texas 78753.

Report Advises Small Users on First DP Experience

MARLBORO, Mass. — Systems software is not usually an important consideration in choosing a small business system, but applications software is critical, according to a report from Data Systems Publications here.

Designed for small business people who are not familiar with basic computer principles, the report covers a variety of topics ranging from a definition of a small business system to aspects of financing the system.

When buying applications software for the system, the user can either buy packaged software or custom software. Although the software package is usually the less expensive alternative, the report said, it provides a standard solution, so "if your business procedures do not follow a standard method then a package will not satisfy your needs. In that case it is sometimes possible to get the package modified. If not, the alternative is custom software.

"It will be worth your time to examine all your business procedures and to make a list of them in the order that their computerization would increase company profits," the report advised. Some procedures "won't be worth the cost of programming," it said.

The simplest course for a user to take is to "find one vendor that can supply both the necessary hardware and software," the report said.

Since some manufacturers cannot provide this service they will "very likely refer you to a systems house or software house that they have worked with before."

It is "most important that the vendor you choose understands your business procedures, problems and needs," it said.

The report costs $18 from Data Systems Publications, Box 510, Marlboro, Mass. 01752.

Minis Span Great Variety of Capabilities, Prices

By Ronald A. Frank
Of the CW Staff

PHILADELPHIA — Minicomputers today can be classified into three categories: mini, midi and maxi, according to George Trimble, president of T-Logic, Inc.

Speaking at a *Computerworld* Computer Caravan session here recently, Trimble said the minis include machines with 4K to 8K words, a Model 33 teletypewriter ASR for I/O and limited peripherals. This type of system typically is priced at $3,000 to $10,000, he said.

The Midi category includes machines with 8K to 64K and it has more extensive peripherals including disks, tapes, printers and CRT units. This system costs about $10,000 to $75,000.

The maxi category has a storage capacity from 64K to 1M words; it may be a 16-bit or a 32-bit machine. This system has many peripherals and an extensive instruction set and is priced from $75,000 to $500,000, depending on features, he said.

The minicomputers available today still have software limitations, Trimble said. High-level languages and data base management systems have thus far been implemented on only a few machines. But good real-time monitors are available for applications that monitor data inputs and require rapid response times, he said.

One reason the cost of minis has dropped is that many hardware options are available as needed by the user rather than as standard features. This type of feature includes multiply/divide, floating-point arithmetic, real-time clock, power fail restart, auto load, memory parity and programmer's control panel, he said.

Larger CPUs have these features built in, but the minicomputer user can choose only the ones he needs, he said.

The increased sophistication along with the decreased price have raised the centralized versus decentralized issue for minis, he said. Centralized mainframes have reduced the unit cost per computation but they have removed the DP function away from the user.

At the same time decentralized minis return the processing power to users at their remote sites. In addition, the cost per computation of mini-based systems is becoming competitive with larger CPUs, he said.

Distributed mini-based systems make it easier for a company to communicate with multiple sites and to configure networks. It also provides users with the capability to build remote data bases that can interact with centralized data bases when the need arises, Trimble said.

Among the typical mini system applications now in common use, Trimble listed data entry, communications between various company sites, intelligent terminal support and back-end systems to support mainframe operations.

Among the capabilities to be available soon, Trimble said he expected multiport I/O controllers, shared memory and intelligent I/O controllers to support terminals and other peripherals. More intelligence will be built into the communications interfaces to continue the trend of taking processing loads off the mainframe, he said.

Although 16-bit machines are still the most popular type of mini, the 32-bit systems will make many of the needed improvements easier to implement, he said.

Shipments Neared $13 Billion

EDP/IR: 1976 Marked Springboard Year for Industry

By Toni Wiseman
Of the CW Staff

WALTHAM, Mass. — The year 1976 was a springboard one for the computer industry, a year that saw computer shipments approach $13 billion, services revenues climb to $5 billion and data communications expenditures top $2.5 billion, according to *EDP/Industry Report (EDP/IR)*.

The report noted several important events during the year:

- New mainframer product lines appeared while older lines got face lifts and IBM introduced two new 370s.
- Network architectures were unveiled and enhanced while AT&T took center stage with its "Bell Bill" — the Consumer Communications Reform Act — and the tariffing of the Dataspeed 40/4.
- Subindustries prospered, as witnessed by minicomputer manufacturers' revenues jumping 36%, with worldwide shipments of $1.9 billion. Meanwhile, the installed value of U.S. general-purpose terminals and data entry equipment hit $8 billion.
- Plug-compatible CPUs appeared that sparked IBM reactions which in turn affected markets ranging from add-on memory and third-party leasing to used computers.

"The basic trends remain . . . data base management, on-line applications, distributed processing, increasing user sophistication, etc.," according to EDP/IR. But the newsletter pointed out yet another trend — increased aggressiveness and competitive pressure from IBM.

"Whether as a result of its courtroom successes or simply the economics of semiconductor production, the Giant's latest price cuts and performance increases will have a wide-ranging impact on the whole industry," EDP/IR predicted.

"Upshot: the mainstream computer business looks ready to roll off its three-year shipment plateau . . . possibly sparking the separate pricing of software," it concluded.

Shipments in Dollars

In 1976, general-purpose computers accounted for $10.52 billion in shipments, $5.23 billion in the U.S.; small business computers reached $620 million in shipments, $415 million in the U.S.; and minicomputer and other systems topped $1.7 billion, of which $1.2 billion was in U.S. shipments, the report stated.

"By 1981, general-purpose computer, small business computer and minicomputer and other system shipments will grow by factors of 1.6, 3.0 and 2.5 respectively," it added.

U.S.-manufactured general-purpose computer shipments climbed to $10.5 billion last year, up only 1% from 1975's $10.4 billion and down 2% from 1974's $10.7 billion, EDP/IR noted.

IBM accounted for 66.1% of the shipments worldwide, or $7.2 billion, while plug-compatible manufacturers cornered 6% of shipments and Amdahl 1.1% — $650 million and $115 million respectively, according to figures supplied by International Data Corp.

Univac claimed 7.3% of shipments, Burroughs 6.4%, Honeywell 6.2%, NCR 3.1%, Control Data Corp. 2.6% and Digital Equipment Corp. (exclusive of minicomputers) 1.2%, the report stated.

Domestic vs. International

"On the international scene, the two-year trend of overseas computer shipments growing faster than domestic shipments is expected to reverse this year. In fact, 1976 is expected to be the only year this decade in which overseas shipments surpass U.S. shipments on a dollar value," according to EDP/IR.

"Furthermore, the net add to the installed base as a ratio of shipments is increasing in the U.S. and beginning to flatten overseas

(Continued on Page 108)

Expect Market Growth

Rivals Say Series/1 Software Helpful

By Molly Upton
Of the CW Staff

The software with which IBM has endowed its previously bare-bones Series/1 minicomputer should boost the credibility of the distributed data processing market and expand the minicomputer market in general, according to a *CW* survey of minicomputer makers.

The Series/1 will soon sport Fortran and PL/I, a real-time programming system and a real-time operating system [CW, April 25].

Rather than fear impact to their own particular lines, most mini makers said they expect the market to grow proportionately to whatever share IBM gains with the Series/1. One admitted he expects that share will be "significant."

Several mini makers pointed out the Series/1 is really not an OEM machine and not oriented toward the OEM market. Nearly all cited the lack of any quantity discount and agreed the principal market for the Series/1 is the large end user.

However, although some see the IBM name as a big selling plus, others pointed out the General Systems Division (GSD) has a separate sales force and doing business with it could be like dealing with another company.

Bob Puette, marketing manager for Hewlett-Packard Co.'s Data Systems Division, said the Series/1 should "increase the credibility of distributed data processing."

The move by IBM into this area should help the market grow and the negative impact will be felt by large mainframes, not minis, he believes.

Sam Lane, marketing manager for standard products at General Automation, Inc. said, "IBM has sanctioned the minicomputer and distributed data processing concept," which should make "the market grow equal to or greater than IBM's ability to capture the market."

Although Digital Equipment Corp. would not comment specifically on the anticipated effects of the Series/1 enhancements, a spokesman there said the benefits of dis-

(Continued on Page 114)

More From Others

Many of the mini makers responding to a *CW* survey indicated they provide a more extensive line of software for their OEM line of minis than IBM does for the Series/1.

IBM recently announced Fortran, PL/I, a real-time programming system and a real-time operating system [CW, April 25].

A Computer Automation, Inc. spokesman said his firm's languages include Assembly, Fortran IV, Pascal, Basic and a Macro Assembler.

CA also offers a real-time multitasking operating system as well as an executive system that includes I/O, communications and file management. Program development aids include loaders, dumps, object linking loader and debug systems.

General Automation, Inc. provides a batch operating system as well as a real-time control operating system and a foreground/background operating system, according to Sam Lane, marketing manager of standard products.

GA's language compilers include Fortran, Cobol and Basic. The firm also has a file management system, a multiterminal system and a line of utilities. GA's minis and micros are software-compatible, he added.

Hewlett-Packard Co. offers Fortran, Basic, Algol, Assembly and microcode for its 21MX series, according to Bob Puette, marketing manager of the Data Systems Division. The microcode capability has been an exceptionally popular item, he added.

HP also offers Image, a data base management system.

Interdata provides several versions of a real-time operating system, Basic, Fortran and a program development package and editors, according to Bill Rosser, director of planning for Perkin-Elmer Data Systems, Interdata's parent.

Software for Honeywell Information Systems' Level 6 includes the Basic Executive System, BES/1, which consists of diskette-based software tools for the OEM; BES/2, a disk-based off-line program development and on-line, real-time executive; and a multidimensional tasking system, Gcos6/MDT.

The latter is a disk-based operating system with executives, file management and communications facilities in a multiprogramming environment, a spokeswoman said.

Basic and subsets of Ansi 74 Cobol and Ansi 77 Fortran are available under BES/2 for one-time license fees.

EDP/IR: '76 Springboard Year As Shipments Near $13 Billion

(Continued from Page 107)

— providing the worldwide base about 10% growth through 1980. Beginning with 1976, the overseas installed base will grow about as fast as the U.S. base," the report said.

In the general-purpose systems arena, U.S. manufacturers shipped 15,500 computers worldwide in 1976 — 8,000 domestically with a value of $5.23 billion and 7,500 internationally valued at $5.28 billion.

Mini Market Stronger

U.S. mini makers shipped 63,800 systems with a total value of $1.59 billion. EDP/IR reported 46,600 mini systems were shipped to U.S. destinations and 17,200 overseas.

With revenues closing in on the $2 billion mark, mini makers were definitely back on their feet after the recession. In fact, growth was close to 40% in 1976, it indicated.

By 1981, the newsletter predicted, worldwide mini revenues for U.S. suppliers should be more than $7.3 billion with annual shipments topping 200,000 units.

"Most of those units to be shipped in 1981 — 70% or so — will go to [OEMs] for use in other products, but almost two-thirds of revenues will come from end-user sales," it noted.

The minicomputer market in 1976 was dominated by Digital Equipment Corp., which reaped $710 million — 38% — of total market revenues. Hewlett-Packard followed with a 16% market share and Data General with 10%.

DG, however, experienced the largest growth, up 60% over 1975, compared with DEC's 42% growth and HP's 27%, according to EDP/IR.

Services Up 17%

Computer services were not left behind by their more tangible siblings — services revenues grew 17%, fast approaching the $5 billion mark, the report said.

EDP/IR indicated salaries accounted for 32% of 1976 DP spending, hardware for 39%, data communications 8%, supplies 4% and outside services 17%.

Services, however, is a highly fragmented industry segment, the report noted, with some 2,000 firms vying for that 17% of total DP spending. Yet six companies account for a quarter of the market: CDC, Automatic Data Processing, Electronic Data Systems, System Development Corp. and GE/ISBD.

Breaking down the services picture, processing services claimed 72% of revenues, software 18% and facilities management 10%, the report stated.

In a further breakdown by application, EDP/IR found interactive problem solving accounted for $525 million in revenues, interactive transaction processing $365 million and remote batch problem solving $325 million.

Batch processing remained the major revenue producer, however, bringing in $1.75 billion in 1976.

While accounting for only $225 million of the revenues, remote batch transaction processing realized the largest growth, 48%.

The outlook for services is bright, EDP/IR said, but cautioned that IBM remains an unknown quantity.

"In 1979, the company [IBM] will no longer be barred from offering computer services — an outgrowth of the CDC antitrust suit settlement — and the Giant's domsat subsidiary, Satellite Business Systems [SBS] will be gearing up to offer its unique data transmission service.

"IBM's not likely to ignore the networking capabilities made possible by SBS . . . nor a potential $8 billion 1981 market for processing services," EDP/IR suggested.

HIS Restructures Domestic Marketing

WALTHAM, Mass. — Honeywell Information Systems, Inc. has reorganized its U.S. computer marketing division, effective July 1.

The marketing emphasis will now be defined along product lines.

"The new organization reflects Honeywell's commitment to serve today's emerging markets and establish the structure for even greater growth in the years ahead," according to Richard R. Douglas, vice-president and general manager of the Marketing and Services Information Systems Division (MSISD).

The new structure of MSISD will include four field marketing operations:

- The new General Systems Operation, which will have responsibility for sales, installation and account management for the small business systems marketplace. This includes the Series 50, Level 61, small Series 200/2000 and the Level 62 base.
- The new Data Processing Operation, which will be responsible for the medium- and large-scale marketplace including the Level 64, 66 and 68 and the medium/large 200/2000 base.
- National Operations.
- Federal System Operations.

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Diablo Aims for Fourth Quarter To Ship Quantity Model 400s

By Molly Upton
Of the CW Staff

HAYWARD, Calif. – Better late than never. That apparently is the feeling around Diablo Systems, which is planning production shipments of its Model 400 disk drives in the fourth quarter of this year rather than the first quarter as originally scheduled.

The drives range in size from 13.3M bytes to 53M bytes.

Despite the delayed shipment schedule of the 400, Diablo's disk products should have a better year than last, according to Stan Silverman, product manager for disks. One reason for Silverman's optimism is that Diablo has ironed out problems with its smaller drives.

Diablo is currently in volume production of the 44B, a modified drive featuring both 5M- and 10M-byte capacity, which is easier to manufacture than the previous separate models, he said. Last year the firm was unable to meet market demand for the drives, he added.

Technology Not the Problem

The Model 400 drives incorporate track-following servo technology, but the new actuator technique was not the source of the production problems, according to Silverman and Ted Charter, product marketing manager for the 400 program.

The new technology incorporates the servo data on the intersector gaps of tracks on each individual disk pack. Diablo has been working on this technique for three years, Silverman said.

The source of the problems lay in such humdrum but necessary engineering details as lids closing, they explained.

"It wasn't show stopper" problems, Charter said, but rather the types that "nip you around the ankles."

The design was released too soon from engineering to production, where problems were encountered, he said.

Charter would not comment on the amount of lost business.

The firm has been trying to accommodate OEM design requirements by sending them engineering prototypes, he said.

Diablo is now running a pilot production line to work out flow and part problems, he added.

Since Diablo hopefully has its startup problems behind, it might be a year ahead of some other firms, Charter said.

Silverman indicated embedding the servo data on the disk itself offers future enhancement opportunities and is inherently more precise than using an external transducer.

Demand Up

Shipment of the 10M-byte cartridge disk is substantially ahead of last year, and demand should be between 20% and 25% ahead of that in 1976, Silverman said.

About 60% of Diablo's disks shipped in 1977 will be the 10M-byte drive, whereas last year it accounted for about half of the volume with the other half in 5M-byte drives, he noted.

Shipments of the 44B began in the third quarter last year. It is priced about 15% less than the 10M-byte Model 43, he said.

EMM vs. Customs Dismissed by Judge

ENCINO, Calif. – A Los Angeles federal court judge dismissed a suit filed by Electronic Memories and Magnetics Corp. (EMM) against the U.S. Customs Service, terming it "premature."

The issue began in 1972 when the Customs Service alleged that EMM underpaid its customs duties on parts imported from Hong Kong and Mexico between 1968 and 1972. Customs asked for a $110 million penalty based on the forfeiture value of the parts.

Customs reduced its claim to $2,841,000 and then, earlier this month, to $1,432,000. EMM, however, decided not to pay the fine and filed in the U.S. District Court seeking relief against further attempts by the Customs service to enforce or collect any portion of the forfeiture penalty.

"Customs is operating under an archaic law which deprives importers of due process of law and which EMM management and legal counsel believe to be unconstitutional," according to Trude C. Taylor, president.

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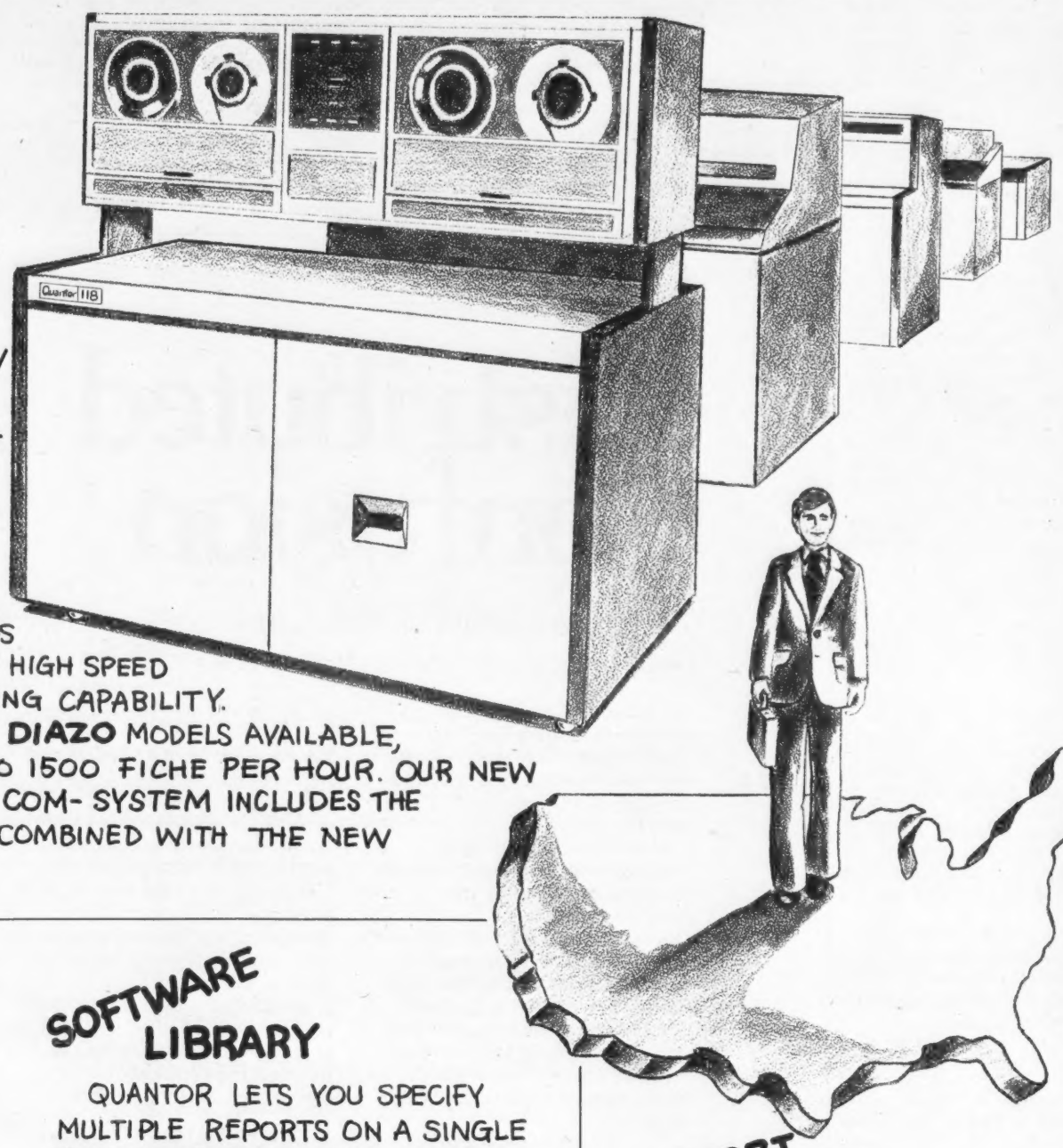

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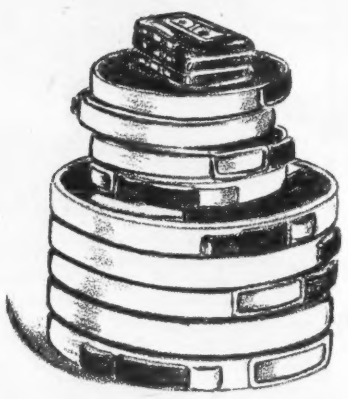

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Itel Diversified When Leasing Became 'Too Vulnerable'

By Catherine Arnst
Of the CW Staff

NEW YORK — Itel Corp., which was started in 1967 primarily as a third-party leasing company for computer equipment, has since diversified into other areas because "the leasing business was too vulnerable" after the announcement of the IBM 370 system, Gary Friedman, cofounder and executive vice-president of Itel, testified at the U.S. vs. IBM trial recently.

The Justice Department is charging in its case that IBM created a leasing environment in the computer industry in order to restrict competition (because of the high cost of establishing a lease base), have stricter account control and guarantee the stability of recurring revenues.

By the late '60s, IBM recognized the leasing companies as a competitive threat and determined there were two major factors it could control that effect leasing company profits: the purchase-lease multiplier and the price of maintenance for purchased systems, according to he plaintiff's pretrial brief.

When Itel entered the leasing market, IBM's 360 system had been on the market for three years and was expected to have a useful life in excess of 10 years, Friedman said.

Itel considered itself a competitive threat to IBM because "we would effectively take away their installed base by converting customers to Itel leases," he said.

IBM's price umbrella with the 360 systems were high enough to allow Itel to lease systems at 80% of IBM's Monthly Availability Charge (MAC) and still make a profit.

Itel also offered operating leases, which meant the equipment would still belong to Itel when it came off lease and so could be remarketed, Friedman said.

Although operating leases were considered a high risk, they also offered a better profit picture to Itel because it would retain ownership of its machines, which could then be considered an asset, he said.

Decision Not to Enter

However, when IBM announced its 370 system in June 1970, it raised its maintenance charges and the purchase to lease multiplier (purchase price divided by MAC), lowered its price umbrella for leasing companies and made the operating lease unfeasible, Friedman said.

The 370 architecture was virtually the same as that of the 360, Friedman said, but because of the unattractive pricing and high maintenance costs of the 370, Itel decided not to enter that market, he stated.

Instead, it tried to develop methods of making the 360 equivalent to the 370 in terms of performance by adding on plug-compatible memories and disk drives, the witness testified.

It marketed Advanced Memory Systems, Inc. (AMS) memories and, in 1971, ran into problems when IBM refused to maintain systems that had AMS memory attached above IBM limits.

Friedman considered this refusal, which claimed it would be "impractical to maintain" systems with AMS memory attached, as a threat by IBM. Itel took IBM to court and received a stipulated judgment in 1972, requiring IBM to exert "best efforts" to maintain such systems, Friedman indicated.

IBM further jeopardized the leasing industry when it introduced its Fixed Term Plan (FTP) in May 1971, which gave rental customers lease plans of 12- and 24 months and slashed monthly payments by 8% and 16% respectively, he said.

The FTP also had substantial penalty fees if a customer terminated the lease early, so users were effectively locked into an IBM lease, Friedman pointed out. The FTP "imposes severe hardships upon existing independents in the form of increased costs and risks," according to an Itel study used during Friedman's testimony.

The study also noted the FTP would "stifle incentive" to invest in research and development of new or improved products by independents.

"At best, we would wait for IBM to deliver its products, modify the product only slightly as opposed to true product design and manufacture a product that is an imitation of IBM's rather than being a truly superior product. No one benefits — except IBM."

As a result of IBM actions in the leasing area, Itel has branched out into leasing carriers and containers for ships and railroads, he testified.

Role of the Distributor — Part 1

Manufacturers Emphasize Significance of Recruitment

By Bruce Milne
Special to Computerworld

The past three years have seen many vendors enter the small business computer market with systems averagely priced at $40,000. Most of them use OEMs, distributors or systems agents instead of direct sales personnel to sell and install these systems.

Almost unheard of a few years ago, this method of selling computers now conservatively accounts for over $300 million in sales with an annual growth rate of over 40%.

Although three-fourths of all small business computer distributors have been in the business less than two years and have fewer than 12 employees, there is already enough data to suggest a future shakeout period when manufacturers who do not have well-chosen distributors, comprehensive distributor marketing and support programs and a complete, competitive equipment line will fail.

It appears that distributors fail because the manufacturer did not use the right selection criteria in the recruiting process nor did it recognize the need for competitive support programs in such areas as cooperative advertising, distributor communications, marketing aids, financing and applications software.

Since competition is more intense today than ever, the distributor has to be well-equipped in management, financing and vendor support to effectively beat both traditional DP companies (IBM, Burroughs, NCR) and the multitude of mini suppliers.

A dilemma for the manufacturer is that if the distributor is not prepared, then he will fail. If he has the management experience, financial, technical, and marketing resources, then he may gravitate toward the vendor who supplies more than just hardware, operating systems and discounts.

Many of the problems encountered in the field are surprisingly consistent from one manufacturer to another. All of them suffer, to some degree, from some common crisis levels in the distributor life cycle. Briefly, there are four crisis levels.

The first is the "start-up" phase where the new distributor is overwhelmed with the complexity of the business and the financial requirements. Competing head-on in a high-technology business with giants like IBM is tough, and some distributors fail because they just do not understand everything involved in selling computers to primarily first-time users.

The second crisis appears at the organizational "critical mass" level. Most distributor organizations are one-man shows and are limited to the capabilities of that individual. This crisis often comes as a surprise to manufacturers because it occurs just when the distributor appears to be doing well — say, 10 systems a year.

At this level of sales, the personnel needs may be increasing almost geometrically to support sales and installations. This increases overhead, working capital needs and forces the owner into a primarily administrative role away from his own area of expertise such as software or marketing.

This combination of cash flow crunch and management crisis is difficult to overcome.

The third level is the "fat and

(Continued on Page 116)

This is the first in a two-part series dealing with some of the findings of a recent industrywide survey on the role of small business computer distributors.

The research was conducted by Bruce Milne and Barry Klett at the Harvard Business School and was supported by Basic Four, Cincinnati-Milacron, Digital Equipment Corp., Lockheed, Olivetti, Qantel and Sycor.

The study included survey responses from 243 distributors and OEMs, interviews with executives of 12 manufacturers that are active in selling via distributors and related research. Because of the similarity in legal relationship, function and problems, distributors, dealers and OEMs were considered together.

Part II will look at the importance of management and support of the distributor organization from the distributor's viewpoint.

Rivals Expect Series/1 Software To Expand Minicomputer Market

(Continued from Page 107)

tributed DP and the use of small computers can only broaden the market.

Data General Corp. had no comments on the latest announcements from the Peachtree state.

Forecasts Expanded

EDP Industry Report (EDP/IR), a publication from International Data Corp., indicated the Series/1 should garner about 17% of mini maker revenues by 1981, but "overall market forecasts, pegged at $6 billion in pre-S/1 estimates, have been expanded by almost a corresponding amount.

"Thus the mini industry as a whole is neither harmed nor hurt by IBM's entry," the newsletter concluded.

However, the "market is liable to become a little less freewheeling now that users have a new standard for comparison . . . and as IBM's market share increases, others will necessarily decrease, perhaps unevenly," EDP/IR stated.

Little OEM Penetration

The lack of any OEM discount has convinced others that the Series/1's market lies with the large end user rather than with the OEM.

The absence of a discount affords no price protection, according to Lane. With quantity discounts, OEMs can pick up some of their profit on the price of hardware; without it, the OEM has to recover his development cost and profit on software and other things, and that would be difficult, he added.

"So I would not expect the Series/1 to penetrate the OEM marketplace," he said.

Puette observed the lack of discounts is a significant roadblock to penetrating the OEM arena. HP has discounts ranging up to 35% for OEMs and 16% for volume end users on its 21MX line of minis which, even before the discount,are less expensive than the Series/1, he said.

But offering discounts could jeopardize IBM's rental base of smaller systems, he remarked, so IBM will have to move slowly.

Puette said there probably will be a slow trend by IBM toward selling rather than renting small machines.

In looking at the capabilities of the Series/1, some mini makers said they feel it is a good machine, while at least one industry spokesman appraised it as a memory-intensive, DP-type solution rather than an OEM solution.

Enhancements Expected

The addition of software to the Series/1 was not unexpected by the other mini makers. Nearly all pointed out their products offer a range of operating systems, languages and utilities that exceed those announced by IBM.

The addition of software is part of an expected series of enhancements, according to Bill Rosser, director of planning for Perkin-Elmer Data Systems, parent of Interdata.

The bare-bones introduction was probably designed to calm people about IBM's entry into the minicomputer business. There will be more enhancements in the future, Rosser speculated.

David E. Booth, Honeywell Information Systems' director of minicomputer and terminal programs and market development, said "IBM is starting with the basics and building up, adding software as it goes along."

Lane of GA said "adding software is an important development and probably indicates there will be more software in the future. The product is becoming more competitive, especially for the end-user marketplace."

Rosser called the IBM software offerings fundamental software packages necessary to support a competitive minicomputer.

Marketing Force

There was some disagreement about the potential power of the GSD's marketing force for the Series/1.

Although one manufacturer felt the IBM name would give it a sizable advantage in selection by large end-user firms, another indicated that dealing with GSD is akin to dealing with a totally different company since GSD's marketing and support organizations are separate from those of the Data Processing Division.

Booth of HIS said "we expect little impact from the enhancements. So far we have experienced very little impact from the Series/1. We just don't see it much in competition in the marketplace."

Interdata doesn't expect much impact either, Rosser said, since much of its revenues come from the OEM sector and the 32-bit product line, which is not impacted by the Series/1.

80% Growth Rate Expected

Japan's MPU Mart Solid, Gaining

By Toni Wiseman
Of the CW Staff

TOKYO — Although the mirocomputer, as the DP industry knows it, was born in1971 when Intel Corp. introduced the 4004 and the 8008 microprocessing units (MPUs), the original plans for developing MPUs were drawn up by two Japanese calculator manufacturers, according to *EDP/Japan Report* (EDP/JR).

The two firms, Busicom (now bankrupt) and Seiko, were working on designs to incorporate the "intelligent chips" into their externally programmable calculators, the newsletter noted.

While only six years old, the microcomputer has already claimed a solid position in the DP industry. The Japanese MPU market has grown 67% annually for the last three years and is expected to climb to an 80% rate during 1977 and over the next few years, reaching the $200 million mark by 1980, EDP/JR indicated.

EDP/JR suggested several factors that will influence the Japanese MPU market:

- "The improving integration density of MPUs — capacities are expected to double during each of the next few years, while unit prices continue to drop.
- "The development of single-chip (or single-board) microcomputers, which will become increasingly available this year (a single board micro contains a clock generator, MPU, read-only memory, random-access memory and I/O interface on a single chip).
- "Semiconductor manufacturers' efforts to boost production and to expand the marketing of large-scale integration (LSI) devices for use with microcomputers.
- "A joint development program between NTT, Hitachi, NEC and Fujitsu to build V-LSIs utilizing an electron beam exposure system.
- "The market growth of MPUs in system applications, particularly in consumer products."

Two years ago, the unit price of an LSI ran about $33. Today it has dropped to less than $3.30, while a 4-bit MPU LSI costs between $6.60 and $9.90. This means that 8-bit microcomputers that cost $43.30 in 1976 are today less than $16.70, EDP/JR said.

Several other Japanese suppliers, such as Toshiba, Nippon Electric Co., Fujitsu, Sharp and Mitsubishi, have stepped up their LSI production during the first quarter in anticipation of a significant microcomputer market growth, the report noted.

"These companies are both suppliers and users of semiconductor devices and, therefore, industry sources project that [Japanese] LSI manufacturers will garner a substantial share of the microcomputer market despite strong competition from U.S. suppliers like Intel, Motorola and Texas Instruments," the newsletter stated.

In 1975, Intel claimed 50% of the Japanese microcomputer market while NEC had 30%, but by 1976 the pendulum had swung in favor of NEC, which had captured a 40% share, outdistancing Intel, it noted.

Last year alone, NEC exported $11.7 million worth of MPUs and LSI memories to the U.S. in addition to its sales in Japan.

International News

Argentine DP Sales Climbing Since '76

BUENOS AIRES, Argentina — "Because of the unwillingness of local manufacturers in [the business machines] field to provide trade associations or government entities with company unit sales, production and other data, no 'hard' estimate of domestic sales and production of office and business machines for 1974, 1975 and 1976 currently exists," according to the Department of Commerce.

However, conversations with local executives revealed that until the second half of 1976, investment in DP and related equipment had been postponed because of the political and economic instability prevailing in Argentina in the last few years.

Commerce reports sales had steadily dropped off during 1974 and 1975 as end users postponed upgrades and new applications.

However, conversations with local representatives indicated a sudden reversal of this trend during the second half of 1976, Commerce noted.

Manufacturers Stress Importance Of Recruiting Quality Distributors

(Continued from Page 113)

happy" stage. The problem encountered here is a common phenomenon in more traditional distributor organizations such as auto dealers and industrial suppliers. For computer distributors, it most likely occurs at about $1 million in annual sales.

At this level, the principals of the business are collecting healthy salaries and an average of $80,000 to $100,000 in net profits. That is a comfortable income and, as one successful distributor said in an interview, "Why grow bigger? I'm making enough now."

The last level of crisis is when the distributor becomes very large — over $2 million in annual sales. At this level, there continues to be financial and management pressure with the added problem for the manufacturer in the "power shift" to one or a few large distributors who may dictate corporate marketing policy.

Obviously, not all distributors experience these crisis levels nor are they as easily recognized as this outline suggests.

The major recurring problems in these crises are management capability, financial pressure and personnel growth.

These are universal problems to this business, and much of their solution boils down to proper recruiting and better support.

A poor distributor can do irreparable damage to a company's image, drain management time and slow up market coverage plans. Despite this, some companies continue to stress the wrong criteria in selection.

Many vendors stress technical or marketing capabilities to balance their particular product offering, which is wrong.

The successful distributor should be chosen based on four criteria:

- Business experience.
- Financial resources.
- Local reputation.
- Industry knowledge (marketing, technical skills).

Experienced, savvy general-manager types with a clear market focus and solid financial resources will nearly always beat the individual who lives off customer deposits and was chosen as an OEM or distributor primarily because he knew how to program the vendor's equipment.

That is not to degrade technical competence; however, it is more important in the long run that an individual be able to make the organization grow and marshal the necessary resources than to be specifically competent in one area, especially with the homogeneous nature of equipment and languages today.

Outstanding Characteristics

In analyzing the successful distributor, there are five characteristics that stand out:

- Distributors who had a prior organization in the computer industry and a local presence tend to do better in both sales and profits.
- Successful distributors average more systems personnel per salesman than less successful distributors — usually, at least four technical support persons for every salesman.
- They concentrate in marketing more by application or industry than geographically.
- The original investment is higher than the average, near $200,000 in combined debt and equity as starting capital.
- Their growth expectations in terms of eventual size are nearly double the average distributor with sights set on the $2 million range.

There are no formulas for who makes the better distributor. Service bureaus come out on top primarily because of their in-place organization prior to marketing minis. However, just behind them are software houses and new ventures, which generally consist of computer salesmen, certified public accountants, consultants and others who had some familiarity with the industry.

In recruiting quality distributors, it is important to note that the relationship will be a sound one, with more commitment on both sides, if the distributor has some type of territory or application exclusivity.

However, great care should be taken not to fall into problems with the Sherman Act, which restricts the manufacturer's control over where a distributor may sell.

Additionally, the contract should be exhaustive and be for more than one year to help the distributor gain local financing.

Special emphasis should be given to sections concerning discounts, manufacturer's liability, territory, conditions for cancellation, software and order acceptance. These are the major areas for effective management of the relationship by the manufacturer.

Operating Leases Seen Leading to 'Financial Suicide'

TORONTO — Writing operating leases on computer equipment is one of the most dangerous and unstable financial or leasing ventures in the world, an industry executive told members of the American Association of Equipment Lessors here recently.

The dangers come from traditional and conservative accounting rules and practices promulgated by the Internal Revenue Service, Security and Exchange Commission, American Institute of Certified Public Accountants and the Financial Accounting Standards Board, according to Sonny Monosson, president of American Appraisal Service.

These groups discourage the writing of full payout leases and encourage lease writing that gives the lessor 20% of the original value as the equipment value at the end of the lease period, Monosson charged.

"This is financial suicide in the computer business," he told the members of the equipment lessors association which has 460 members with over $100 billion of leases in force.

Operating leases generally are leases in which less than 90% of the original value of equipment is recovered through payments, and firms that lease computers have been overly optimistic in anticipating the market or residual value of the computer at the end of the operating life of the lease, Monosson said.

The result is little or no profits and even losses when the lessor counts on the residual value in a used equipment sale for his profit on the lease, he explained.

Future Values 'Elusive'

All the major computer leasing companies specializing in operating leases suffer from poor financial performance because they consistently underestimate the potential of new computer technology to rapidly obsolete computers and destroy their value.

The computer industry is at its fastest rate of technology change, making future residual values of computer equipment "elusive" and difficult to predict without closely considering technology impact, he indicated.

A 20% residual value in a tractor, dump truck, coal hauler, etc., is logical because of the lack of change of the product, Monosson explained. This type of capital equipment — like drill presses, lathes, milling machines and aircraft — keeps its value because of the low rate of technology change in these areas.

In fact, taking inflation into account, these capital assets maintain a high residual value, he said.

Suffer From Rapid Innovations

In comparing these capital assets to computer equipment, Monosson explained, computer equipment values suffer from rapid technological innovations in size, cost and performance. New technology such as semiconductor memory and single-chip computers are typical of the advances that wiped out values of the IBM 360 computer series.

These high technology factors are now eliminating the residual values of all computer equipment, he emphasized.

Lessors must be careful in selecting the hardware that they lease, he warned, to make sure that the original vendor will still be in business five or six years in the future when the computer hardware is returned from lease.

He cited cases of rapid deterioration over the past five years in the values of Memorex CPUs, RCA systems, GE systems, XDS systems and others after those companies dropped out of the computer manufacturing business.

"Once a vendor leaves the field, demand for his hardware vanishes almost overnight," he said.

He also warned the lessors about investing in vendors who change support policy such as Honeywell did recently when that firm made it very difficult to transfer software with used equipment sales.

Other companies, such as Burroughs, deliberately destroy residual values for a lessor by selling their own older traded-in equipment below current market levels, he charged.

Executive Corner

- Robert S. Dickerman, John R. Johnson and Roland R. Speers have been elected to the board of directors of Logicon, Inc.
- Edward P. Harley has been appointed to the board of directors of Ross Systems, Inc.
- Colin C. Hampton and Peter Nessen have been elected to the board of directors of Bradford National Corp.
- Louis H. Benzing and Carl W. Stursberg have been elected to the board of directors of Decision Data Corp.
- Dan L. McGurk, former assistant manager of the Office of the Management of the Budget, has been elected to the board of directors of Datum, Inc.
- R. Kevin Heinle was elected to the board of directors of Datamatics Management Services, Inc.
- Jim Capuzzo was appointed president of NCE Computer Systems, Inc., part of the NCE Group.
- Raymond J. Noorda was elected president and chief operating officer of Systems Industries.
- Louis E. Hodges has been elected president of the reorganized Vanier Division of Magnetronics International Corp.
- John F. Carlson has been elected treasurer of Cray Research, Inc.
- John McNeil has joined Data Logic, an independent British software firm, and will have special responsibility for computer networks, distributed systems and microcomputers.
- Richard E. Weber has been appointed vice-president of Honeywell Information Systems' Product Management Operation.
- John Mills was named to the newly created position of senior vice-president; Mike Vargo to vice-president of medium systems; Ron Baker to vice-president of large systems; and Don Dupuis to vice-president of CMI Corp.
- William Lawrence has been named vice-president of finance for General Datacomm Industries, Inc.
- Allen D. Fleener has joined American Systems, Inc. as vice-president of marketing, sales and field service.
- Martin M. Glassberg was appointed vice-president, finance for Rapidata, Inc.
- Lee Benedict was elected vice-president of marketing; Jim Ragano, vice-president of engineering and material; and Roy Long, vice-president of manufacturing operations for Xebec Systems, Inc.

Microcosm

Pace Now Bipolar on One Board

SANTA CLARA, Calif. — National Semiconductor Corp. is producing a single-board, bipolar version of its Pace microprocessor that is reportedly two times more powerful than most single-board micro systems.

The Super Pace is source code-compatible with the rest of the Pace family, National Semi said.

The original instruction set has been expanded to 75 from 45. The unit has a 220 nsec cycle time and an average instruction execution interval of 1 microsec, according to a spokesman.

There is a 16-bit address bus as well as a 16-bit bidirectional data bus.

The unit is said to fill a gap between the N-channel MOS single-board micros and the bipolar slice-oriented minis.

In volumes over 100, the IPS-16C/100 Super Pace CPU boards range from $529 to $600 each.

A six-slot prototyping system incorporating the CPU board, 16K by 16 random-access memory board, an 8K by 16 programmable read-only memory board, an I/O communications interface board and a software package is available for $3,735.

National Semi is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Iowa Plans Course

AMES, Iowa — A week-long conference on microprocessor-based systems will be held here at Iowa State University June 20-24 for people involved with computer applications at their organizations.

The course, limited to 24 people, is intended to provide the background and experience for designing microprocessor-based systems.

The conference fee is $345 and registration is on a first-come, first-served basis. Information is available from Roger Camp, 332 Coover Hall, Iowa State University, Ames, Iowa 50011.

Signetics Adds 8080A Emulator

SUNNYVALE, Calif. — Signetics' 8080 emulator kit enables bipolar emulation of the Intel 8080A with speed improved by as much as nine times, according to the firm.

The kit also allows expansion of existing 8080A-based systems with no change in software, Signetics claimed.

The emulator features a 150 nsec micro-instruction cycle time and random-access memory access time, the firm said.

The kit contains preprogrammed microcontrol store, printed circuit board and an instruction manual with schematic and microcode listings, a spokesman added.

A single 5V power supply, hardware multiply and divide and a full vectored interrupt to any location within 64K are provided.

The 3000KT8080SK costs $299 in single quantities from the firm at 811 E. Arques Ave., Sunnyvale, Calif. 94086.

Intel Introduces Family Of Fully Static 4K RAMS

SANTA CLARA, Calif. — Intel Corp. has introduced four models of low-power consumption 4K fully static random-access memories (RAM) in 18- and 20-pin versions.

The 2114, 2114L, 2142 and 2142L consume 50% to 75% less power than standard 1K static RAMs, according to the firm.

The "L" designates units with power consumption about 30% less than standard series. Maximum power dissipations are 525 mW for the 2114 and 2142 and 370 mW for the L versions, Intel said.

Each series contains three speed selections, 200-, 300- and 450 nsec maximum access time and minimum read or write cycle times, Intel said.

Prices range from $17.35 for the plastic dip 2114L to $25.50 for the high-speed ceramic pin version of the 2114 and 2142.

Intel is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

RCC Offers Fortran Floppy

DAVENPORT, Iowa — Realistic Controls Corp.'s (RCC) Z//25 Fortran IV-Minifloppy Kit operates with standard S-100 bus systems with 20K of random-access memory (RAM), the firm said.

The unit includes a Shugart SA400 drive, an interface module kit, a disk operating system with file management, a text editor and Fort//80, Fortran IV for the Intel 8080 microcomputer.

The kit costs $1,095; an assembled unit is $1,220. The second minifloppy drive kit sells for $449 or $495 assembled from RCC at 3530 Warrensville Center Road, Cleveland, Ohio 44122.

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Serve as a team member for design development documentation testing and enhancing of large compilers.

MINICOMPUTER OPERATING SYSTEMS

Responsible as a team member for design, implementation and testing of interactive general purpose operating systems to support COBOL applications and utilities, written and assembly language.

DIAGNOSTIC DESIGN & PROGRAMMERS

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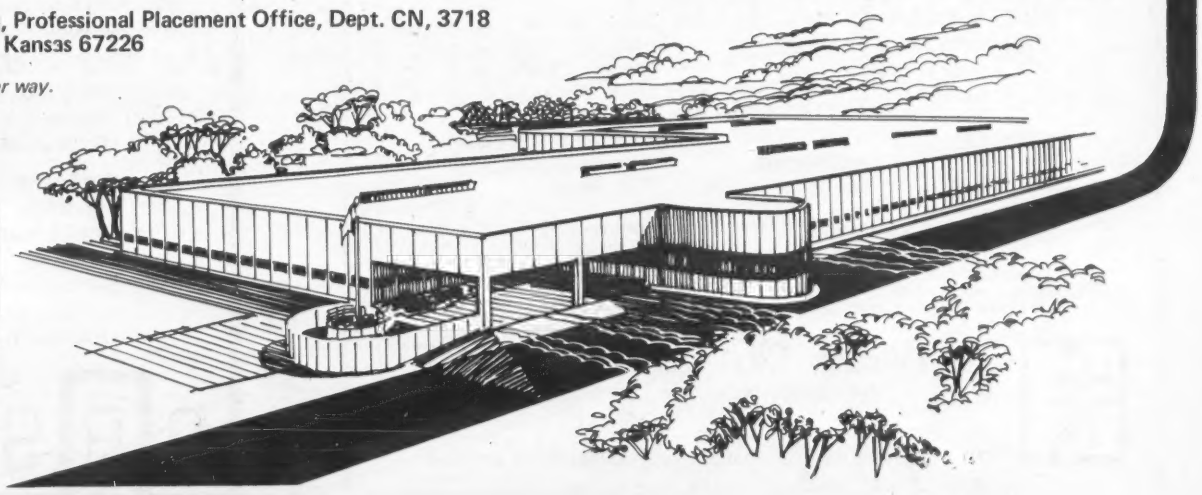
By Resume: Mr. Jerry Long, Professional Placement Office, Dept. CN, 3718
North Rock Road, Wichita, Kansas 67226

You'll get complete details either way.



NCR
Complete Computer Systems

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Tektronix Adds Graphics Display

BEAVERTON, Ore. — Tektronix, Inc. is offering a 19-in. storage-refresh graphics display for $4,775 in a stripped-down but functionally operational version.

The GMA101A allows users to build up complex pictures piece by piece using a combination of refresh storage to generate the picture, the firm said.

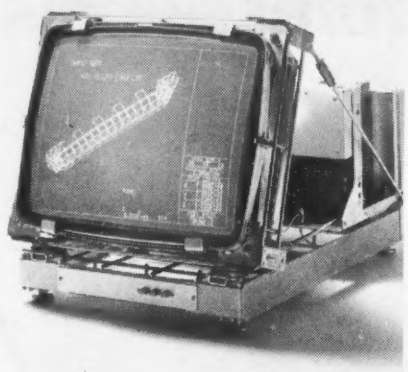
The unit was designed for high-density graphics applications with moderate interactivity, a spokesman added.

An optional character/vector generator allows creation of a display with more than 3,200 in. of stored vector and over 8,500 alphanumeric characters, he said. In addition, the screen can display up to 600 in. of refreshed vectors.

There are three modes of operation: store, store-refresh and nonstore.

The module permits the display to be oriented either horizontally or vertically or tilted back 15 , the firm said. The interface is all digital except for the X and Y inputs.

Tektronix is also offering support options such as display exercisers.



Tektronix GMA101A

Tektronix Information Group is at P.O. Box 500, Beaverton, Ore. 97077.

Large-Capacity Memory Offered

SUNNYVALE, Calif. — Intel Memory Systems' In-1600 dynamic semiconductor memory system was designed for OEMs requiring memory capacity in excess of 128K bytes.

The system features a capability for automatic or external refresh and comes as a basic card set or in a chassis.

The unit can be expanded beyond 1M byte by 9 bits and word width beyond 18 bits, the firm said. Access time is 330 nsec and cycle time is 500 nsec.

Modes of operation include read, write and read/modify/write, a spokesman noted.

As a card set, the memory unit cards of 64K words by 18 bits are priced from .17- to .26 cent/bit in quantities of one to 100. Control unit cards cost $300 and buffer unit cards cost $180.

As In-Minichassis, 7- by 19- by 17 in. including power supplies and blowers, costs $1,225. The price for a larger In-Unichassis varies depending on options.

More information is available from Connie Magne, Intel Memory Systems, 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

HI Enhances 8200 Print Set

AUSTIN, Texas — The print set of Houston Instrument's (HI) 8200 series of line printers is expandable to 192 characters with a $295 option that can be retrofitted for an additional fee, the firm said.

The option permits mixing of different characters on the same print line, thus allowing the same printer to be used with two or more languages, HI said.

The 80-column model costs $3,450 and the 132- column model is priced at $3,785 without the option. The former can operate at speeds up to 2,400 line/min; the latter can handle 1,400 line/min.

The firm has character sets for the Cyrillic, Katakana and Swedish languages. It also offers the symbols used on the New York Stock Exchange.

HI is at 8500 Cameron Road, Austin, Texas 78753.

OEM Products

Burroughs Has Gas Display

PLAINFIELD, N.J. — A programmable 32-character alphanumeric gas discharge panel is available from Burroughs Corp.'s Electronic Components Division.

The Self-Scan Model SSD0132-0081, with a pair of programmable read-only memories (Proms), can hold a 64-character repertoire, Burroughs said.

The maximum character entry rate is 166,000 char./sec, Burroughs said, and the size of the characters is .2 in. high and .14 in. wide in a 5 by 7 dot matrix. They are readable at distances up to 15 ft, the firm claimed.

Price for 1,000 units is $172, which does not include ROMs or Proms.

Burroughs Electronic Components Division can be reached through P.O. Box 1226, Plainfield, N.J. 07061.

Ball Upgrades CRT Monitors

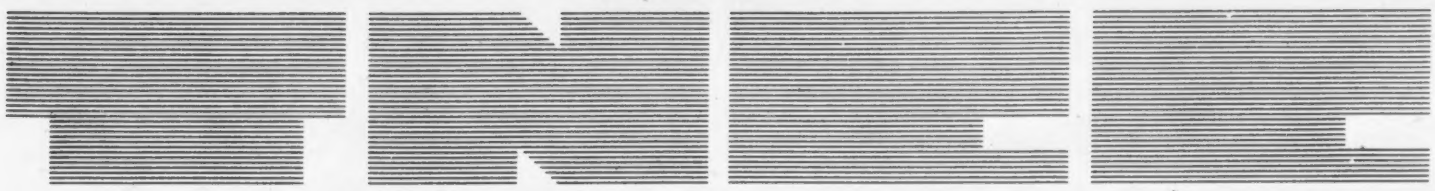
ST. PAUL, Minn. — Ball Brothers Research Corp.'s Electronic Display Division has upgraded its line of general-purpose CRT monitors.

The enhancements include electronic video centering within the raster and electronic horizontal and vertical linearity controls.

IC regulators are on ac units and there is 100% silicon circuitry on all models, the firm said.

The horizontal drive input pulse range has been widened and vertical linearity improved for better performance, according to a spokesman.

Prices have not changed; they range from $100 to $200 depending on quantity and the version of the TV-50/90/120 series, he said. Ball can be reached through P.O. Box 3376, St. Paul, Minn. 55165.



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Huntington Station, N.Y. 11746

Earnings Reports

SYCOR
Three Months Ended April 3

	1977	1976
Shr Ernd	$.10	$.42
Revenue	17,205,000	15,794,000
Earnings	343,000	1,238,000

TELEDYNE
Three Months Ended March 31

	1977	1976
Shr Ernd	$3.61	a$2.21
Revenue	545,859,000	459,950,000
Earnings	44,116,000	33,308,000

a-Adjusted to reflect a 3% stock dividend in May 1976.

TRW
Three Months Ended March 31

	1977	1976
Shr Ernd	$.86	$.72
Revenue	776,900,000	722,500,000
Earnings	31,700,000	26,500,000

UNITED TECHNOLOGIES
Three Months Ended March 31

	1977	1976
	(000)	(000)
Shr Ernd	$1.41	$1.23
Revenue	1,361,727	1,194,258
Earnings	45,723	36,134

a-Adjusted for 100% stock dividend in May 1976.

WESTERN UNION
Three Months Ended March 31

	1977	a1976
Shr Ernd	$.57	$.45
Revenue	157,243,000	148,243,000
Earnings	9,919,000	7,358,000

a-Restated to reflect June 1976 acquisition of Telstat Systems, Inc.

CARTERFONE COMMUNICATIONS
Six Months Ended March 31

	1977	1976
Shr Ernd	$.06	$.25
Revenue	5,137,500	4,499,900
Earnings	125,000	518,000

COMPUTER COMMUNICATIONS
Three Months Ended March 31

	1977	1976
Shr Ernd	$.15	$.10
aRevenue	3,581,148	2,049,925
Tax Cred	220,000	134,000
Earnings	461,306	274,644
9 Mo Shr	.45	.22
aRevenue	10,002,762	5,377,746
Tax Cred	640,000	300,000
Earnings	1,336,776	610,049

a-Revenues from Memorex Corp. were $866,578 in the three months this year compared with $755,048 in the 1976 quarter and $3,590,415 in the nine months this year compared with $1,743,301 in the 1976 period.

COMPUTER SCIENCES
Year Ended April 1

	1977	1976
Shr Ernd	$1.02	$.51
Revenue	234,745,000	219,910,000
Tax Cred	3,000,000	.....
Earnings	14,635,000	7,233,000
3 Mo Shr	.27	.15
Revenue	63,168,000	61,910,000
Tax Cred	750,000	.....
Earnings	3,870,000	2,128,000

COMPUTER TASK GROUP
Three Months Ended March 31

	1977	1976
Shr Ernd	$.12	$.04
Revenue	1,966,566	1,050,929
Tax Cred	9,000	.....
Earnings	91,539	31,992

COMSHARE
Three Months Ended March 31

	1977	1976
Shr Ernd	$.40	$.42
Revenue	5,364,786	3,540,403
Tax Cred	171,300	245,000
Earnings	653,449	573,338
9 Mo Shr	.98	.72
Revenue	12,975,370	10,215,496
Tax Cred	433,000	442,00
Earnings	1,472,198	977,618

CONTINENTAL LEASING
Year Ended Dec. 31

	1976	1975
Shr Ernd	$.17	$.06
Revenue	5,338,900	3,510,800
Earnings	238,300	82,800

CPT
Three Months Ended March 31

	1977	1976
Shr Ernd	$.23	$.20
Revenue	3,098,026	2,905,121
Earnings	289,557	227,907
9 Mo Shr	.60	.57
Revenue	8,385,129	7,719,331
Earnings	767,199	658,597

DATA 100
Three Months Ended March 31

	1977	1976
Shr Ernd	$.30	$.25
Revenue	28,937,000	29,284,000
Tax Cred	140,000	126,000
Earnings	1,314,000	946,000

DATAPOINT
Three Months Ended April 30

	1977	1976
Shr Ernd	$.60	$.54
Revenue	26,276,000	19,506,000
Earnings	1,948,000	1,669,000
9 Mo Shr	1.84	1.61
Revenue	73,109,000	50,610,000
Tax Cred	.....	495,000
Earnings	6,026,000	4,561,000

DATAPRODUCTS
Year Ended March 26

	1977	1976
Shr Ernd	$1.63	$.98
Revenue	115,298,000	85,085,000
Earnings	a12,184,000	b7,076,000
3 Mo Shr	.41	.30
Revenue	30,386,00	23,397,000
Earnings	3,075,000	2,194,000

a-Includes $1,118,000 net gain on sale of building. b-Includes $615,000 net gain on sale of Data Card shares.

DOCUMATION
Three Months Ended April 22

	1977	1976
Shr Ernd	$.20	$.15
Revenue	6,282,563	3,285,473
Earnings	590,749	386,055

GRAHAM MAGNETICS
Three Months Ended March 31

	1977	1976
Shr Ernd	$.37	$.16
Revenue	4,795,469	3,939,402
Earnings	344,647	150,001
9 Mo Shr	a.87	.80
Revenue	13,948,477	12,114,012
Earnings	a811,351	750,564

a-Reflects deduction of $250,549 for class action settlement.

POSITION ANNOUNCEMENTS

COMPUTER SYSTEMS PERSONNEL

FOR A DIFFERENT, MORE CHALLENGING CAREER FUTURE... LOOK WHAT HEWLETT-PACKARD CAN OFFER YOU!

Hewlett-Packard has continuously played a leading role in the mini-computer field since 1966. As manufacturers of processors and a variety of peripheral equipment including terminals, disc memories, magnetic tape units, data input readers, and high-speed plotters, we can offer you challenging and rewarding opportunities in many areas of the industry and across the United States.

In addition, we offer excellent income, a comprehensive benefits program that includes basic life, hospital, surgical, dental and long-term disability insurance, profit sharing and company-contributed stock-purchase plan.

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- St. Louis
- Portland
- San Francisco
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- Dayton
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POSITIONS AVAILABLE INCLUDE:

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(HP Computer Systems)

Opportunity for the individual with two or more years experience in computer systems sales with BSEE or Computer Science degree preferred. You will be working in designated territory to business and education or industrial and OEM accounts. Salary plus commission.

SALES REPRESENTATIVES
(Terminals)

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Entry level sales or systems training positions providing technical and daily support services to sales team as well as continuing customer support. Positions require BSEE or Computer Science degree plus programming knowledge and some prior computer experience. Salary.

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Opportunities for individuals with BSEE or Computer Science degree and a background in commercial processing with experience in COBOL, RPG, Data Base Systems or minicomputer experience utilizing real-time multi-programming operation. Position responsibilities include technical back-up for field sales team and assisting customer in solving systems applications problems.

CUSTOMER ENGINEERS

Positions for individuals with BSEE or Computer Science or Engineering technology degree and experience in computer systems maintenance. Responsibilities will include acting as field service representative to install and repair the HP Computer Systems line.

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To arrange a local Dallas interview and get all the details on a career with Intel, call Ed Haynes at (214) 241-9521 on June 13-16 from 9AM to 6PM.

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We need Field Sales Managers capable of motivating and directing the efforts of direct sales personnel and manufacturers' reps in the OEM microcomputer and memory systems marketplace. Requires 5-7 years experience in sales and sales management in microcomputers or related field.

LSI Field Sales Engineers

Experienced field sales engineers with proven ability to penetrate new markets and develop existing accounts for memory and microcomputer semiconductor components. 3-5 years sales experience in the semiconductor industry preferable.

LSI Field Application Engineers (Microprocessor Components)

Will provide technical support to our direct field sales, manufacturers' reps and customers with application information on Intel microprocessors. Strong background in microprocessor hardware and programming required.

Systems Field Sales

Experienced field sales engineers with demonstrated ability to penetrate new markets and develop OEM microcomputer and memory systems accounts. Requires 3-5 years sales experience in related field.

Field Application Engineers (Systems)

These applications engineers will provide technical support to our direct field sales, manufacturers' reps and customers with application information on Intel microcomputer systems.

Marketing & Applications Engineers.

You may qualify for one of the positions listed below if you have a BSEE (MSEE and MBA preferred) plus appropriate background. Based at our Santa Clara, California, headquarters, you'll enjoy life on the San Francisco Peninsula, often called the most livable place on earth. Specific opportunities include:

Sr. Product Marketing/Planning Engineers

Several openings exist in such Intel product areas as static and dynamic RAMs (associated with mini- and large computers), bipolar PROMs and CCDs for engineers with 8-10 years experience in computer or memory design.

Additional openings in other product areas exist for engineers with 6-7 years in new product planning, market definition, introduction strategies, pricing, data sheets, competitive market analysis and long-range planning. Heavy emphasis on product marketing and engineering. Advanced planning and financial analysis of the semiconductor industry.

Senior Applications Engineer

You will be responsible for generating technical information via application notes and articles on Intel's dynamic RAM memory components. Involves strong technical interface and assistance with customers using Intel products and periodically conducting memory systems design seminars as lecturer. Requires 4-6 years experience.

If you won't be able to call, please send your resume, including salary history, in confidence to Intel Employment, Attn: Ed Haynes, 3065 Bowers Avenue, Santa Clara, CA 95051. An equal opportunity employer m/f.

intel

Reliability Assurance Engineer

A challenging position is open for a qualified person to develop programs to monitor and predict product life availability and reliability. Involves reliability consulting to design engineering and product evaluation upon request, reviewing major component specifications for reliability content and assisting in reliability planning.

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Salary is open. Benefits include educational support, insurance and profit sharing programs.

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Tektronix
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- **Flight Data Analysis**
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- **Operations Systems Programming**
- **Realtime Avionics**
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- **Signal Processing Software Development**
- **Software/Computing Systems Design Analysis**
- **Software and Computer Testing and Evaluation**
- **Support Software Design and Development**

A BSEE, Computer Science or other applicable engineering degree and U.S. citizenship are required.

Attractive salary, fringe benefits and moving allowances will be offered qualified candidates. And living is a pleasure in the unspoiled Northwest with its many recreational and sports activities and relaxed life-styles.

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WORLD HEADQUARTERS - DAYTON, OHIO

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Mr. Vernon L. Mirre
Corporate Executive & Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

TERMINAL SYSTEMS DIVISION-DAYTON DAYTON, OHIO

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- Microprocessors
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- Systems Constructors & Generators
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Terminal Systems Division – Dayton
NCR Corporation, Dept. C-613
Dayton, Ohio 45479

NCC INTERVIEWS DATA PROCESSING DIVISION SAN DIEGO, CALIF.

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- Firmware
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- O/S Project Lead

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- Software Configuration Management

(Design, develop programs to support software testing, release and repair)

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents.

To arrange for an NCC INTERVIEW

Call George Rice
214/748-8080

on Monday, June 13, through Wednesday, June 15

or send resume immediately including salary history, training and experience to:

Mr. George Rice
Data Processing Division
NCR Corporation
16575 W. Bernardo Drive
San Diego, Calif. 92127

NCR

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You'll live in sunny Lubbock, a city of 190,000. It's got the high, dry air and cool nights that go with an altitude of 3,000 feet. The cost of living is low; there's no state income tax and there's plenty to do. There's civic symphony, ballet, theatre, museums, and a planetarium. And Lubbock is the home of Texas Tech, a growing university where you can continue your technical education through the PhD level.

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Build and develop retail distribution network. Be responsible for customer training as well as sales and technical support, and end-user sales seminars. Prepare and execute marketing plans for specific vertical markets. Requires good understanding of consumer marketing, plus compatability with both Field Sales Force and Retail Network. Requires a BS in a technical field and 3-4 years' experience in related work.

Market Development Analyst
Perform analysis and market research to determine optimal marketing strategies for new computer products, including distribution channels, served markets, service and software requirements, advertising and product positioning, etc. Aggressive personal goals in marketing and product management based on performance are essential. Requires a BS in Engineering or Marketing, plus MBA. Minimum skill requirements include knowledge of computers, programming, and small business DP market.

Product Manager
Develop and implement total marketing plans for consumer or programmable calculator line. Responsibilities include product planning/definition, competitive analysis, and ongoing marketing support. Ongoing market support entails channel selection, forecasting, merchandising planning, and contact with field sales force and key customers. Requires a MBA with technical degree, and 3-5 years' experience.

Engineering Manager
P and L responsibility for consumer calculator profit center. Responsibilities include product line definitions, product development, cost reduction and design to cost, product pricing, and market analysis. BS in Engineering with at least 6 years' related experience, including 2 years in a management capacity.

System Computer Programmer
Specifications, design, coding, integration and debugging of operating systems. Self-checking diagnostics, device service routines, file management, etc., is also required. Work with high level language translators. Requires BS in Computer Science, EE or other relevant technical discipline and, 2-5 years' experience in Assembly language programming. Experience in design and specification writing desirable.

Advanced Applications Programmer
Duties include writing, testing and documentation of accounting and financial programs for small business computers. Must have good programming skills, along with some knowledge of business data processing. Requires degree in Business Administration, Computer Science or Data Processing, plus knowledge and experience in BASIC Assembly language, and 2 years' experience

Product Engineer
Mechanical design of advanced professional calculators, including plastics, packaging, etc. Requires mechanical or industrial engineering degrees, and 2-4 years' related experience in design of complex products.

Project Manager
Manage new production development projects including scheduling, budgeting, coordination and execution of plans. Work involves electrical and mechanical design, software, tooling, manual publications, and related packaging. Coordinate requirements with outside vendors. Requires a BS in a technical field (ME, EE, IE), plus 2 years' minimum of related experience.

Scientific Programmer
Develop algorithms, microcode, assemblers, and simulators supporting LSI microprocessor designs for consumer products. Requires BS/MS in EE, Computer Science, Math, or Physical Science.

Dallas Interviews

For an interview appointment, call John Kearley at (214) 747-2011 on June 12 from Noon-6 PM, or on June 13, 14, 15 or 16 from 9 AM-7 PM.

If unable to arrange an interview on these dates, send your resume in complete confidence to: **Staffing Manager/Consumer Products Group/ P.O. Box 5012, M.S. 11/Dallas, Texas 75222.**

TEXAS INSTRUMENTS
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You will participate in engineering software reliability and quality assurance of hardware diagnostics and control systems programs for Amdahl's 470V/6 computer system and new products. You have knowledge of and experience with most of the following: computer organization, logic design, minicomputer operating systems, software reliability, higher level and assembly languages (PL/1, 370 Assembler, NOVA Assembler preferred). You have an MSEE or Computer Science degree and a minimum of 3 years' experience or equivalent. Please indicate 435-E on your response.

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You'll join a field force of more than 500 who have helped us build our reputation as a leader in total computer capability. You'll provide professional guidance and service to our customers on all IBM operating systems — OS/MVT,MFT; OS/VS1, OS/VS2 (SVS & MVS), DOS/VS and VM/370. And you'll work with the Advanced System, Itel's more powerful, more efficient and more reliable alternative to the IBM 370.

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FACULTY POSITION IN BUSINESS DATA PROCESSING

The Data Processing Department welcomes applications for a faculty position available September 7, 1977. A Bachelors degree required, Masters preferred. Three years business data processing experience is required. Rank and salary dependent upon qualifications. Requires strong interest in undergraduate instruction and ability to teach courses in the following areas: Systems Analysis and Programming Languages (COBOL, 360/370 ASSEMBLER, FORTRAN & RPGII). Send complete resume to Professor Stuart J. Travis, Head, Department of Data Processing, Ferris State College, Big Rapids, MI 49307.
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You'll participate in real-time software design efforts related to an extremely low frequency (ELF) communication system being developed to provide communications with submerged Fleet Ballistic Submarines. This unique mode of communication, based on radio frequencies of less than 100 Hz, with wavelengths thousands of miles long, will allow messages to be received underwater half a world away. This long range development program will utilize real-time minicomputer applications employing AN/UYK-20 data processors in a multicomputer configuration.

A knowledge of one or more of the following will be necessary: Assembly language and CMS-2; Real-time executive control (SDEX/20); Software/hardware integration; Documentation standards per SECNAVINST 3560.1; Applications related to fault detection and isolation (on-line/off-line), signal processing, digital filtering, message injection and handling, secure data communications, and/or display and control.

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You'll design, code, and test programs that will implement such important features as call precedence and preemption, conferencing, call transfer, automatic line hunting, and many others. Experience in assembly language programming in large real-time systems plus the ability to work independently as well as with a team of other software developers is necessary.

Please forward your resume outlining salary history to Sally G. Silver, GTE Sylvania, Eastern Division, 77 "A" Street, Needham, Mass. 02194.

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Heavy experience required in the management of engineering design groups handling mulitple peripheral programs including disc and tape drives, printers and CRT's.

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Will report to the Operations Manager in the MIS group and be responsible for the administration of DEC PDP-11/45 for development of software projects. Interface with DEC hardware and software support groups and other software and hardware vendors. You will be training and supporting users of the System.

BS/BA in Computer Science or equivalent data processing experience with at least three years of data processing experience. Experience with DEC PDP-11/45 including familiarity with DEC's DOS Batch Operating System including MACRO 11 Assembler is required. Must have solid Fortran experience.

Please send resume including salary history to Mike Boyd, Dept. 136CW, The Foxboro Company, 38 Neponset Ave., Foxboro, MA 02035. Foxboro is an equal opportunity employer M/F.

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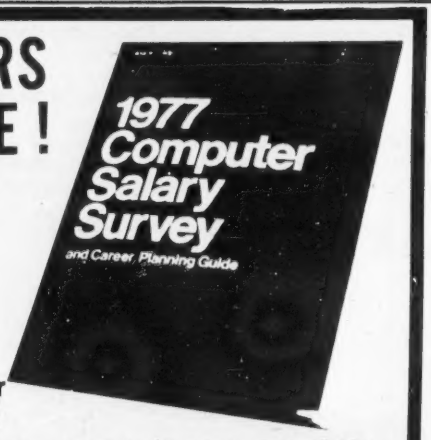

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Cleveland	216/771-2070	Palo Alto	415/328-7155
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Working manager of a systems support section. CICS and DOS/VS internals a definite plus. $17,472/yr.

COMPUTER ANALYST and PROGRAMMER personnel also needed. $16,660 and $13,166 respectively annually. COBOL mandatory and CICS desirable.

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Have you wanted to make a move into a growing FORTUNE 500 Company, but have been concerned about getting the children thru school? We STILL need programmers, systems analysts, and project leaders. Credentials should include experience on either IBM, Honeywell, or Burroughs equipment. COBOL, PL/1, BAL and Assembler. Data Base, T.P., or minicomputer experience a plus. Lucrative salaries ($17-26K) and unbeatable benefits. Call or send resume to Viki Coshow.

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Position requires 1 yr. IMS, 5 yrs. in DP (banking preferred), COBOL, data base and user requirement exp. exssential.

Programmer/Analyst

Position requires 3+ yrs. exp. in COBOL, OS/VS1, and knowledge of JCL & utilities. Prior analysis exp. on development of a Payroll Personnel System preferred. Responsibilities include designing, writing, testing, documenting, implementing & maintaining computer programs for user departments and installing small to moderate size systems.

Qualified applicants are invited to send resume, including salary history, in confidence, to Ernesto Romero, Professional Employment, FEDERAL RESERVE BANK OF SAN FRANCISCO, 400 Sansome St., San Francisco, CA 94120. An equal opportunity employer M/F/H.

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- **at least five years data processing experience**

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We would also like to hear from people with experience in other database packages and with systems experience in OS and VS environments.

Send resume to:

MANAGER, DATABASE DEPT.
CACI, INC.-COMMERCIAL
75 Rockefeller Plaza
N.Y.C., N.Y. 10019

C.A.C.I.

COMPUTER PROGRAMMING PROFESSIONALS

Northwestern University has 3 outstanding positions available in administrative data processing on the Evanston campus, a very desirable Chicago suburban location. We now have a 370/138 with DOS/VS, CICS/VS and 3340 disc drives. We can offer a challenging opportunity in a pleasant academic environment. We need well qualified professionals for future growth. If you feel you can qualify and would like to grow with us in an on-line environment, you may be interested in one of the following positions:

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Requires throorough knowledge of systems programming function. Solid experience with DOS/VS, CICS/VS and BAL. A background in COBOL, VSAM, and/or POWER/VS will be a definite plus.

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Position requires a top-flight Systems Analyst with a financial and accounting applications background. Must be a proven problem solver. On-line experience and knowledge of top down analysis and design techniques desirable. Must have good communications skills, both written and verbal.

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This is a unique ground floor opportunity perfectly suited to an individual with 1-2 years of solid COBOL programming experience. The ideal candidate will have an IBM 370/135 DOS/VS background and possibly some experience with BAL, CICS, and/or PANVALET.

In addition to the rich and stimulating atmosphere of our Evanston campus, the professionals who join us will find an excellent salary and benefit program which includes 3 weeks paid vacation after one year. Send a detailed resume with salary history in complete confidence to:

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Evanston Campus
NORTHWESTERN UNIVERSITY
1812 Chicago Ave.
Evanston, ILL 60201
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CALL
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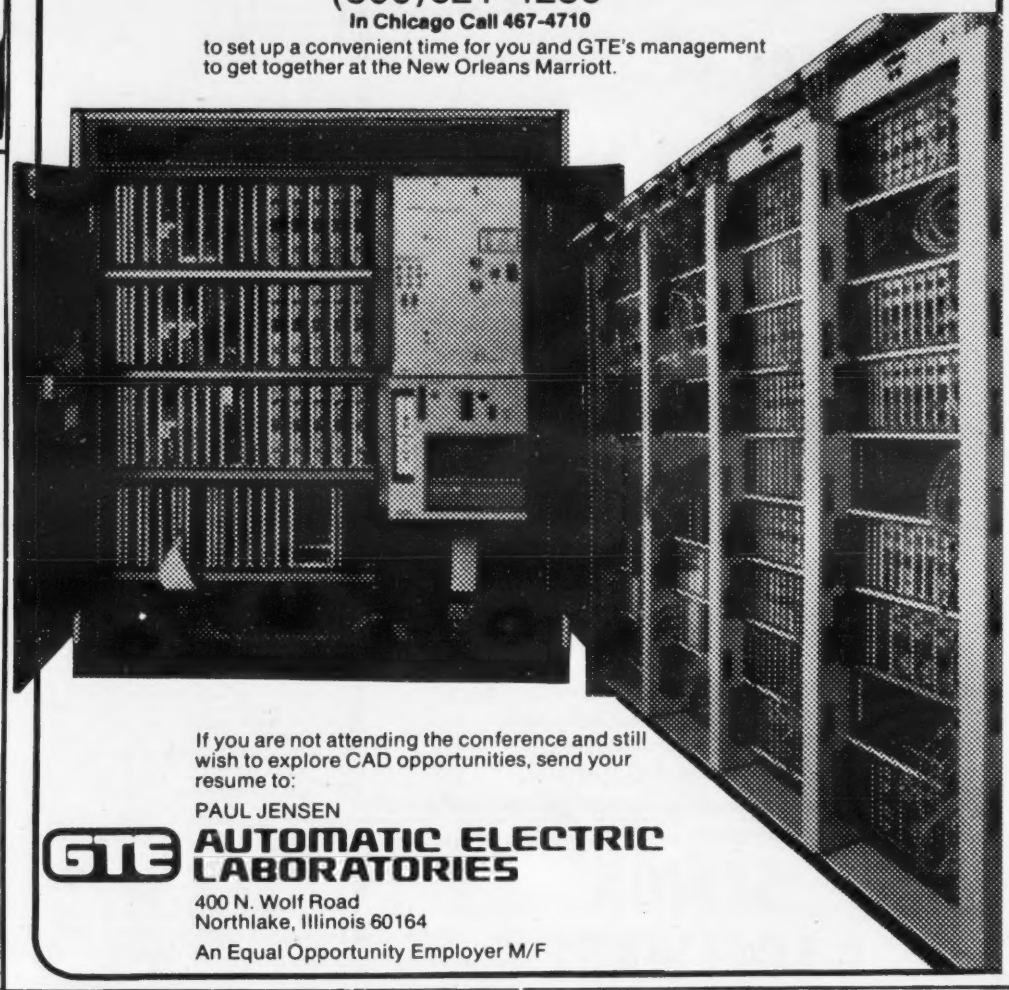

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Candidate should have had a substantial amount of computer programming experience, preferably in machine language, and should be interested in a career in computer applications in medicine. He/she also should have experience in project supervision.

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Due to expansion, our Data Processing Dept. has a position available for individual with B.A. in Business. Candidate to share responsibilities of design and programming of Automated Management Information System, with emphasis on Financial Management, and intergration of newly developed sub-systems with existing computer applications. Required ability to become lead programmer, previous design experience and 2 to 5 years CICS & COBOL a must. Hospital background and experience with SHAS & hospital payroll a plus. Current configurations include IBM 370-135, CICS VS and COBOL VS. Investigate the salary potential and growth opportunities with our hospital. Submit resume to: Mercy Hospital, 6th and University; Des Moines, Iowa 50314. EOE

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- B.A. or B.S. Degree in Math, Computer Science, Business Administration, or Engineering preferred.
- Proven project leadership skills, both technical and administrative.

Responsibilities will encompass planning, coordinating and controlling manufacturing projects within systems for local and remote plants; and developing requirements, specifications, estimates, schedules, and leading programming activities. You'll also assist in user training and development.

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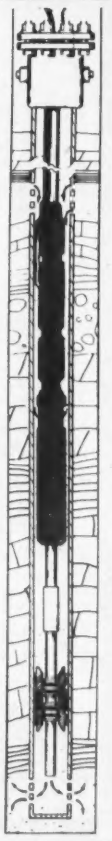

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Data Processing Systems Programmer to work in computer software development for a multi-campus University Computer Center. Minimum requirements, 3 years of high level system programming.

Prospect will be employed as a senior staff member to work with new software development projects for a 370/168 - MVS. Software includes CICS/CS, IMS/VS, MODEL 204, TSO, WYLBUR, ATMS, and JESII. Advanced training will be provided. Position carries 5 weeks vacation per year. Salary open.

Starting date July 21, 1977; closing date for receipt of resumes, June 21, 1977. Send resumes to:

R. Schramm
University of Illinois
Room 370 RRB
P.O. Box 4348
Chicago, Illinois 60680

The University of Illinois is an Equal Opportunity Employer and encourages applications from women and minorities.

TEXAS

needs
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1-5 years experience ALC, COBOL or FORTRAN IBM 370 DOS or OS IMS DL1 CICS a plus

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High motivation atmosphere with mature growth leader.
Excellent compensation for winners.

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Individual will be responsible for planning, development and implementation of a data base management system, as well as significant additions to the company's information system. Applicant should have direct experience with a time sharing system and will be responsible for a current staff of seven, utilizing a Digital PDP 1140 RSTS/E system.

Requirements: Applicant must have ability to supervise the growth of a DP system for a company which plans to double sales in three years; must have a strong business background; 5-9 years experience in data processing, with 3-4 years of supervision experience. Ability to perform system analysis, design and programming necessary. Successful candidate will have college degree and large systems planning and management experience.

The position offers excellent salary and benefits. Send your resume, including salary history, in confidence to:

V.P. of Finance
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PROGRAMMERS

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PROGRAMMER/ANALYST

SUNY College

State University College at Fredonia, New York with 5000 students has immediate need for a highly competent COBOL programmer/analyst to maintain and develop college administrative applications. Will assume major design and supervisory role with heavy user interface. Requirements: five years COBOL minimum plus excellent record of accomplishment in higher education applications. Desire: degree; Burroughs medium systems experience and on line/data base management knowledge. Provide references, salary needs by June 30th to Director, Computer Center, SUC Freduonia, N.Y. 14063.

Realtime Systems PROGRAMMER ANALYST Pharmaceutical Research

REQUIRES:

1. Degree in Engineering or Computer Science
2. Expert knowledge of PDP 11 including RT-11 or RSX-11M system programming
3. 3 or more years experience in Realtime system design and programming

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1. Knowledge of data communications hardware and software
2. Applications experience in chemical or medical lab automation, or industrial process control

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NCR, Special Systems Division, is a small division located in modern Sorrento Valley Industrial Park (suburban San Diego). We are a systems development organization involved with complex EDP and a new high technology systems.

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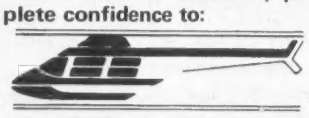

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To Dynamic Marketing Professionals:
Prime Interviews at NCC.

At Prime Computer, we have doubled our sales and facilities in the past year alone. Major factors in our growth are our dynamic and creative marketing and field service organizations. We consider our marketeers and field service personnel of Prime importance to our growing operations and reward them accordingly. If you are dynamic and want to play a key role in helping us continue to grow at our home office or one of our field locations, then get in touch. Right now, we are seeking proven individuals with 3-5 years background in the following areas:

Marketing Representatives
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Systems Analysts
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Prime offers an excellent employee benefits program and dynamic opportunities for professional growth. Please call Jay Lyons at (214) 233-6091 at our Dallas office, Prime Computer, Inc., 4825 LBJ Freeway. If unable to visit us at this time forward your resume to Jay Lyons, Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, MA 01701 or call COLLECT at our Framingham office (617) 879-2960 Ext. 467.

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This position offers an outstanding opportunity for an individual with enthusiasm, strong leadership skills, an ability to communicate, proven marketing ability and demonstrated product management accomplishments.

For consideration, contact Milt Reed, V.P. Marketing at N.C.C. (Booth 1165) or submit resume with salary requirements in confidence to Professional Employment, 2805 Bowers Avenue, Santa Clara, Calif. 95051.

VERSATEC
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PDP-11 • JR. & SR. PROG ANALYSTS

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- 1† years experience working on DEC PDP 11 under RSTS-E and Basic Plus
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- Should have solid experience with commercial applications to include inventory control. Sales Order Entry, Billing, Accounts Receivable and General Ledger.

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- Complete benefits package and full tuition refund
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Above all, we have made a total commitment to the Mini Computer Field. If you have done the same and fit the above qualifications, please call Mr. Mark Atherton, Director of Personnel at (212) 371-9600, or rush resume to his attention.

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- Transaction Processing
- Data Base Systems and Programming
- Experience in Conversion or Migration between Operating Systems
- Syntax Analysis or Compiler Development Skills
- Multiple language experience
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These openings exist in our Customer Support Services Organization and will entail responsibilities in post award installation and conversion support, long term development projects, and project management. Successful candidates must be mature and aggressive individuals who enjoy close customer contact. Relocation assistance will be provided for individuals hired from out-of-state. Please submit your resume and salary requirements to:

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P.K. Vervais
SPERRY UNIVAC
P.O. Box 3525
St. Paul, Minn. 55165

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Our client, a recognized leader in the computer industry, is searching for a Department Manager within its software development organization to assume responsibility for a major project in the area of user-oriented systems software. The Department Manager will report directly to the Corporate Executive responsible for all software development activities.

The Department Manager will staff and manage a group of 50 software professionals; develop user-oriented system software; define new projects and products; and interface with hardware development groups.

Qualified candidates will have a proven track record as a project manager in a software development environment and have significant experience with user-oriented software. Bachelors and masters in computer science or EE is highly desirable.

Interested candidates should forward their resume and salary requirements in confidence to Benson, Holt & Stern Associates,
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Successful candidate will have 2-5 years proven experience in large scale system design/implementation of accounting/financial applications, including on-line, using high level languages. These positions require highly motivated, self starting individuals, with an excellent opportunity to advance with the organization.

We offer a salary commensurate with experience and complete benefit package. For immediate consideration, send resume, including salary history, in strictest confidence to:

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$1,912-$2,517/mo

Qualifications: High school graduation or equivalent and training in the operation and programming of data processing equipment; three years of responsibility in computer programming including two years of direct responsibility. **Duties:** Design, test, codes, prepares and maintains computer programs. Documents and codes data processes. Creates special reports and file extraction using generalized routines. RPG 2/CCP and government experience desirable.
How to Apply: Submit application (supplemented with resume' if desired) to Personnel Office, Matanuska-Susitna Borough, Box B, Palmer, Alaska 99645.
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Qualified candidate should possess 3+ years of systems design/OS programming with some exposure to database design. IBM 370, OS COBOL/PL-1 language experience required, and online teleprocessing exposure a plus. College degree in Engineering, Management or Computer Science desirable.

We offer a competitive salary and benefit structure with ample opportunity for professional growth. Please submit your resume, which must include salary requirements to be considered, in confidence to:

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Technology development would include experience in one or more of the following disciplines:

- **Data base management/distributed processing,**
- **Image processing,**
- **Computer networking/ARPANET protocols,**
- **Microprocessor software development,**
- **Operating systems (UNIX, RSX-11D)**

Experience in real-time communication systems with experience in one or more of the following:

- **Packet switching**
- **Security kernel**
- **Operating systems**
- **Test and diagnostics**
- **On-line/off-line T&D routines**
- **Integration & testing of real-time systems**

Interview Information

We invite qualified candidates to call us in Dallas Sunday, June 12 from 10 AM to 6 PM; Monday & Tuesday, June 13, 14 from 9 AM to 6 PM at (214) 748-3771 - ask for Bob Leedom. If unable to call at this time, please send resume with salary history/ requirements to Professional Employment, Dept. JJL-23, U.S. citizenship required.

Ford Aerospace & Communications Corporation

Western Development Laboratories Division
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Washington

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Data Base Systems

Candidates will have a minimum of ten years experience in the above areas, five of which must have been systems analysis. Background in programming, proposal development, state-of-the-art of hardware and software technology are required.

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Competitive salary and excellent company benefits are offered. Only individuals satisfying the minimum qualifications need apply. Send resume and salary history to:

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Software Opportunities

NCC Interviews in Dallas
call Larry Schnicker (214)-234-2431
Tues. June 14, 6-9pm • Wed. June 15, 9-6
Thurs. June 16, 9-12 Noon

At GTE Laboratories we are leading the GTE companies toward products and systems of the future. Part of this task falls to our Central Computing Facility which serves the Laboratories and GTE engineering locations around the world.

Our modern facilities are set off in a wooded area with campus-style buildings to provide an atmosphere conducive to innovation and creativity. And our Rte. 128 Waltham location is at the center of greater Boston's world-renowned research and development community.

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You will lead a research effort directed toward the development of new languages, software testing and new structured design.

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You will develop tools and techniques to improve the software development processes for application in realtime control systems, such as control of circuit switches. These tools include design and test languages and software test systems.

A degree is required plus familiarity with realtime or operating systems and structural design concepts. Microprocessor programming experience is desirable.

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An excellent opportunity for a creative professional to work with a Computer Aided Design team developing advanced register level simulation and test generation software for digital circuits. The position involves building a translator for a high level language for modeling the functions of microprocessors and other complex devices at the hardware microoperation level. The project supports design efforts throughout GTE including the design of Microprocessor based systems and very large scale integrated circuits.

The position requires a degree in Computer Science. Electrical Engineering or a related field and experience in developing applications software in high level languages. Work on the development of compilers, simulators or CAD programs and experience with PL/I a plus.

Systems Programmer

You will be responsible for the generation, maintenance and enhancement of a MVS operating system on a 370/168. BS degree plus at least 3 years' systems programming experience on MVT, SVS or MVS operating systems is required. Knowledge of JES 2, SMP, TSO and performance measurements is desirable.

Recognizing the universal demand for top software professionals we offer an excellent compensation and benefits package including company paid dental insurance.

To investigate these opportunities further, we invite you to forward a resume or detailed letter including salary information to Mr. Larry Schnicker, Personnel Supervisor, Dept. 613-CW, GTE Laboratories, Inc., 40 Sylvan Road, Waltham, MA 02154.

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(609) 667-4488

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RSVP SERVICES
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VS SYSTEMS PROGRAMMER

Knowledge of VS2 (SVS, HASP) and internals along with detailed knowledge of Assembly language, internal control blocks, software design. Implementation and knowledge of communications systems and/or CICS desirable.

VM 370/CMS SYSTEMS PROGRAMMER

Must be able to demonstrate working knowledge of VM and/or CMS internals. Experience with RSCS, VNET, and/or VM/CMS desirable. Supervisory experience a plus.

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CSC
PROGRAMMER/ ANALYSTS

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If you have expertise in any of the above and two years experience, send resume and salary history to:

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SOFTWARE PROFESSIONALS

ADVANCED DEVELOPMENT SYSTEMS SUPPORT

General Instrument Corporation's Data Systems and Services Group in Maryland and in various nationwide field support locations is increasing its professional staff due to expanding requirements in our growing transaction processing systems business. End products are retail point-of-sale terminals, state lottery, off-track and on-track wagering systems utilizing the most advanced hardware and software technology to provide uniquely tailored systems for a wide variety of customers. Requirements include a broad range of computer professionals for a wide variety of challenging assignments.

We have immediate openings in:

ADVANCED DEVELOPMENT

Bright, creative software professionals are needed to invent real time transaction processing systems for the 1980's. Individuals with background and potential to develop operating systems, real time on and off-line applications, distributed processing techniques, higher level languages, telecommunications and data base management systems are requested to apply. Advanced degrees are preferred tfor some openings, but significant technical accomplishment is a more important qualification.

SYSTEMS SUPPORT

Openings exist in Maryland and several nationwide metropolitan areas for systems personnel to support customers in the field. Responsibilities of positions include defining retail systems specifications, bringing a software expertise to the marketing/sales cycle and providing liaison with customers in a problem solving and training role.

MINICOMPUTER APPLICATIONS

We seek proven capability to provide minicomputer based products to our expanding retail and wagering systems customer base. Programmers who are experienced in assembly or higher level languages for real-time, on-line systems are required. Knowledge of PDP-11, Nova, Varian or similar minicomputers along with ability to program, debug, install and troubleshoot systems is important.

Qualified candidates in any of the above skills are requested to forward resumes and salary requirements in confidence to:

GENERAL INSTRUMENT CORPORATION
DATA SYSTEMS AND SERVICES GROUP
11126 McCORMICK ROAD HUNT VALLEY MARYLAND 21031

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COMPUTER PROFESSIONALS

As one of the midwest's leading multi-divisional management consulting and systems integration organizations, our steady growth requires top professionals in the following areas:

* **IBM 370: Systems Software, CICS, COBOL, PL/1**
* **BURROUGHS: Medium and Large Systems**
* **HONEYWELL: COBOL, Fortran**
* **Real-Time Programmers: Experience in Minicomputers**

Top salaries, fully-paid fringes including life, health and dental insurances, moving allowance and educational benefits. Call or send your resume to:

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is your thing:

Large Scale systems development (DB/DC), 370/168, OS/MVS, TOTAL DBMS, TCAM, TSO as well as an outstanding in-house technical education center.

Do you want a change, want to be in on something special?

We are a rapidly expanding organization in the health insurance field offering growth opportunities to EDP Specialists with at least 3 years experience. Our data processing staff has openings for the following:

SYSTEMS PROGRAMMERS
SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS
PROGRAMMERS (COBOL,BAL)
MANUAL SYSTEMS ANALYSTS

Excellent company benefits:

So if you're interested in working in one of the most advanced data processing departments in the country, send your resume (including salary requirements) to:

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of Greater New York
622 Third Ave., NY, NY 10017
Attn: Employment Manager
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OLIN Has the Environment You Want, to perform at your best and to grow professionally.

OLIN, a large and successful technical company, has scored an impressive growth record. Our Chemicals Group, largest within Olin, has sales exceeding half-a-billion, and steadily climbing. And Olin, as you might expect has always emphasized Systems and advanced computer-based management approaches. Finally, add our convenient location and beautiful facilities. It all adds up to an opportunity for solid, rewarding career progress.

At least 5 years' experience is needed in systems programming, with knowledge of BAL, JCL, OS/VS utilities and OS/VS internals essential. Teleprocessing background and VSAM experience will each be a plus. A broad systems programming foundation is needed, including ability to analyze dumps and to assist COBOL programmers. You'll be working with 170/158 MVS, 3 megabytes.

Our salaries, fully competitive, will reflect your experience and capabilities. Please send resume, with salary data, in confidence, to: Mr. John Dunn, Placement Officer, CW.

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Olin

ADP Analysts/Programmers/Computer Operations

WANT UNLIMITED HORIZONS? COME TO THE MIDDLE EAST.

A major U.S. Company is offering ADP professionals in outstanding opportunity to broaden their expertise in the Middle East. We specifically need military-oriented supply and logistics support.

EDP Systems Analyst
with 5 years experience in ADP Systems Analysis; expert knowledge of current ADP hardware/software; qualified in development of data base retrievals, complex systems designs and telecommunications. You'll also need proof of involvement with development of a major automated system; strong background in ADP logistics (preferably military supply); familiarity with RPG, COBOL and assembler, and knowledge of IBM 370/System 3.

Senior EDP Programmer
Must have 8 years experience in ADP programming; knowledge applications; proficiency in COBOL, RPG, and assembler; proof of involvement with major systems programming effort; knowledge of IBM 370/Systems 3; ability to plan and manage large scale projects; BS degree in computer science or math mandatory.

Computer Operator
with 3-4 years recent experience operating IBM360/370/Systems 3; experience in tape, disc and teleprocessing systems and peripherals, and knowledge of RPG II and COBOL.

EDP Programmer
with 5 years in ADP programming; knowledge of current ADP software development techniques; programming for telecommunications/teleprocessing; programming proficiency COBOL, assembler and RPG II; experience with IBM 370/Systems 3.

Senior Software Systems Programmer
must have recent extensive experience in programs, file structure, data base design and management. Familiar with IBM 370 Systems 3. Architectural experience required. Must know software COBOL, RPG, POWER/VS JCL, DOS/VS, CICS and Assembler languages. Family status offered.

All positions offer excellent salaries and benefits like free housing, low food costs, and liberal leaves and vacation. Resume must include IBM systems worked on, languages familiar with, and in-depth experience. Please indicate position on your resume and send it in confidence to:

CW Box 5078
797 Washington St.
Newton, Mass. 02160
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CAREER OPPORTUNITIES

Control Data Corporation is seeking motivated professionals who have IBM OS/VS experience to work on the 38500 Mass Storage Systems.

OS/VS SYSTEMS PROGRAMMERS

Oppportunities for Systems Programmer/Analysts in the areas of software development, maintenance, software/hardware testing and field support. Internals knowledge (and hands-on experience) with one or more of the following systems required: MVT, VS1, SVS, MVS and JES3.

OS ASSEMBLERS PROGRAMMERS

Career advancement opportunities for OS/VS Assembler Programmers. On the job training will include all currently supported IBM OS/VS operating systems. Necessary formal training will be provided.

PERFORMANCE MEASUREMENT & CONFIGURATION TESTING

Opportunities for professional with the following background. Experience with one or more software performance measurement packages, software/hardware tuning experience, OS/VS JCL knowledge, working knowledge of statistical analysis techniques and ability to program in one or more high level language. OS/VS assembler desirable. Hardware monitoring experience desirable. Duties will include test design/implementation and execution for performance and reliability measurements based on hardware/software configuration.

OPERATOR/PROGRAMMER

Career opportunities for professional with a good knowledge of OS/VS JCL and experience with one or more of the following areas: programming in a high level language, OS/VS assembler, and S/370 console operations. Initial duties will include S/370 operating to conduct and monitor software/hardware testing, test job JCL maintenance, test programming and library maintenance.

FOR IMMEDIATE ATTENTION,
PLEASE SEND YOUR RESUME OR CALL COLLECT TO:
Peggy L. Bernhardt
Peripheral Systems Group
CONTROL DATA CORPORATION
2200 Berkshire Lane
Minneapolis, Minnesota 55441
(612) 553-4720

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Systems Programmers

As one of the midwest's leading multi-divisional management consulting and systems integration organizations, our steady growth requires top professionals in the following areas:

*** IBM 370: Systems Software, CICS, COBOL, PL/1**
***BURROUGHS: B4700 and B6700**
***HONEYWELL: COBOL, Fortran**
***Real-Time Programmers: Experienced in minicomputers.**

Top salarries, fully-paid fringes including life, health and dental insurances, moving allowance and educational benefits. Call or send your resume to:

M.I.S. INTERNATIONAL, INC.
31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010
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PROGRAMMERS

STEP INTO AN EXCITING FUTURE WITH TTI

Transaction Technology, Inc. (TTI), a subsidiary of Citicorp, is dedicated to the design and development of electronic banking products, and specifically, Electronic Funds Transfer Systems. Our continued advancement and achievement is due to a strong recognition of the need for high technology, and the commitment to a staff of talented individuals who make it all happen.

We are currently seeking qualified individuals with strong assembly language background in on-line real time systems, large data base experience and knowledge of communication networks for the following areas:

SYSTEMS ENGINEERING:

With a minimum of 3 years experience in the development of interactive and multi-programming systems and/or associated communications systems in the following areas:

- Operating systems for time sharing and real time processing
- Distributed data base processing
- Applications processing
- Communication subsystems for switching, concentration, network and terminal control
- Dial-up, private and public data network offerings
- Intelligent terminals

DIAGNOSTIC SOFTWARE:

With hands-on hardware experience in mini-computers and ability to read logic diagrams. Background in large rotating memories and microprocessors is a plus.

COMMUNICATIONS SOFTWARE:

With sound background in interactive network information systems, communications protocols and message switching. A working knowledge of dial-up private and public data networks is required.

SYSTEMS SOFTWARE:

With a minimum of 3 years experience in one of the following areas:

- Operating Systems: Background with interactive real time, large data base systems; task scheduling; reentrient code and error diagnostics.
- Data Base Management: Working knowledge of sophisticated access routines and file recovery techniques for large data bases.
- System Performance: Experience in system performance analysis and responsibility.

MICROPROCESSOR SOFTWARE:

Experience in the design of microprocessing firmware applications or diagnostics using the Intel 8080 for network applications.

SYSTEM ANALYSTS/APPLICATIONS SOFTWARE:

With the ability to design and develop software for banking and retail services applications. Background in financial/banking/credit authorization systems a definite plus.

TTI offers an exceptional salary and benefits program which includes a comprehensive group insurance program, pension plan and education assistance to name just a few. We are surrounded by beautiful suburban communities, just minutes from beaches, mountains, deserts, various cultural centers and, of course, Disneyland.

With TTI, you can have the best of two worlds . . . the rewards of a stimulating work environment coupled with the joys of Southern California living! If you thrive on challenge, are committed to quality, and want to work in an environment where your ideas are respected, let's discuss your future and ours. Send your resume, including salary history, in complete confidence to:

LORRAINE WATSON, PERSONNEL MANAGER
TRANSACTION TECHNOLOGY, INC.
10880 WILSHIRE BLVD.
LOS ANGELES, CA. 90024

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TTI

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SYSTEMS AND PROGRAMMING SUPERVISOR

University administrative computer center with 1 meg IBM 370/138 seeking individual with BS degree in Computer Technology or related field and five years experience in Systems Analysis/Programming. Proficiency in COBOL and DOS/VS required. Knowledge of BAL and CICS/VS desirable. Previous supervisory experience desirable. Send resume, salary history and requirements to:

Walter Miner
Data Systems and Services
PURDUE UNIVERSITY
CALUMET CAMPUS
2233-171st Street
Hammond, Indiana 46323
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SYSTEMS PLANNING MANAGER

E. Coast corp seeks experienced UNIVAC mgr to direct current, future systems in hardware & software. Salary to $30,000 (Fee Paid).

PROJECT LEADERS

New England mfr. seeks individuals to direct internal consulting staffs. Bkgd in mfg & engineering. EDP & manual systems. Salary to $26,000 (Fee Paid).

Contact Stan Durbas for details on both openings.

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DIRECTEUR GENERAL FRANCE

DATA COMMUNICATION

A unique opportunity exists for French speaking EDP executives wishing to work in France with a challenging and highly remunerated responsibility. Our client is a very important multinational, operating successfully in Europe. The French subsidiary is national in operations and growing rapidly by providing a full range of terminal equipment with systems application.

The general manager will automatically be a member of the international management committee of the data communications division at corporate headquarters in Europe.

Compensation will be in the range of $55-65K.
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Avenue Bel Air 70
1180 Brussels
Belgium

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CONTACT: Mr. Ed Land at (408) 734-5800, COLLECT or call our local operator at 1-800-821-7700, ext. 607 (Missouri residents call 1-800- 892-7655, ext. 607). to outline your basic qualifications, or send resume to address below.

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For additions to our staff, we'll consider candidates with two to four years of Programmer or Programmer/Analyst experience using COBOL and/or BAL. You'll find our working environment superior to most with a package of benefits which compares with the very best.

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COMPUTER SOFTWARE SPECIALIST

Aquidneck Data Corporation, an innovative new software consulting firm located in Middletown, Rhode Island, is hiring computer software specialists to fulfill commitments in Navy on-line systems for shipboard applications. Openings exist for qualified professionals in system design, programming, documentation, and management.

• THE COMPANY

The company is founded on a philosophy which includes employee ownership and control; bonuses for excellent achievement; profit sharing; Management by Objectives; and an open, professional atmosphere.

• THE AREA

Middletown, Rhode Island is located next to historic Newport, and is convenient to both the Providence and Boston metropolitan areas. It is pleasantly situated on the ocean and in peaceful rural surroundings. It offers a diversification of both winter and summer recreational activities.

• THE WORK

Aquidneck Data Corporation's business is based on identifying with the customer and solving his problems. For this reason, employees need excellent communication skills and an ability to function effectively in a team. There are opportunities for leadership and management, as well as technical achievement in the following areas:

SYSTEMS ANALYSIS

Systems Analysts at both the junior and senior level are needed for software development projects. Required technical skills include computer program design, coding, checkout, documentation, and system integration. Experience is desired in AN/UYK-7 programming particularly in on-line combat systems applications. Experience with CSM-2 and the AN/UYK-20 is also useful.

SYSTEM TEST ENGINEERS

Openings exist at senior level positions for consulting on the TRIDENT CCS integration/certification testing efforts. Requires knowledge of TRIDENT CCS and preferably experience in combat system testing.

ADVANCED SYSTEMS ANALYSIS

Positions are open for complex shipboard operational system design for mid-1980's submarines. Requires in-depth knowledge of state-of-the-art software architecture and development techniques. Prefer experience with on-line combat systems.

TECHNICAL WRITERS - NAVY OFFICERS

Senior level positions are open for candidates with technical writing experience in computer software documentation. Assembler language programming experience, knowledge of Navy combat systems, or systems analysis background is desired. Individuals with backgrounds as Navy commanding officers on FBM submarines are also being hired to develop documentation.

SOFTWARE CONFIGURATION MANAGEMENT

Individuals with experience in software configuration management and control of large scale software products are being hired. Recent experience with Navy combat systems and project management is desired.

If you are looking for an opportunity for professional growth, send a copy of your resume to:

Ms. Janet Cooper
Aquidneck Data Corp.
Box 99 • Middletown, Rhode Island 02840

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MIS PROFESSIONALS

Expansion and promotions have created opportunities for professionals in the following areas:

SYSTEMS

3-5 years experience in the design of major systems. Data base design concepts a definite plus.

PROGRAMMING

1-5 years experience in ANS COBOL. Some systems design experience helpful. Mini-computer experience a definite plus.

TECHNICAL SUPPORT

Experience in communications processing and systems performance analyses. Solid DOS experience, Proficiency in BAL. Mini-computer experience a definite plus.

We are a medium-size installation located in Chicago convenient to the Stevenson Expressway. Our systems are on-line as well as batched an our application areas include: order entry, inventory control, manufacturing, accounting, market research and point of sale. GROW WITH US! For consideration send resume with salary history, in confidence to:

TOM LUREAU
(for the Systems and Technical Support positions)

JIM ZEKAS

(For the Programming Positions)

Personnel Manager
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An IC Industries Company

COMPUTER PROFESSIONALS

BCS has achieved widespread recognition and customer commendation as a growing leader offering a steadily expanding line of state-of-the-art computing services.

This could be your opportunity to join our fast-paced McLean. Virginia facilities – relied upon by many businesses, industry and government organizations, small and large to fulfill their demanding data processing requirements.

Immediate openings are in the following areas:

Applications Analysis

Financial systems, MIS and data base management systems (IDMS and S2000).

APL Internals/File Systems

Knowledge of VM/CMS desired.

Quality Assurance

370 OS/TSO systems software development and certification.

TSO Systems

Performance Monitoring, Multi-processing, MVS and VM.

Systems Programming

VM systems software, BAL, PL/I, communications.

Individuals selected will enjoy excellent career potential along with generous company paid benefits and compensation programs.

For confidential consideration, send resume and salary history to Gordon Grant.

BCS BOEING COMPUTER SERVICES, INC.

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Systems Programmer

CDC CYBER 7000/Operating Systems

Broadly diversified energy systems company, Combustion Engineering runs one of the most advanced computer and international data communications networks currently in operation. Our equipment includes a CDC 7600 and CYBER 172, both used to support engineering and scientific workloads.

In an environment matched to the broadest professional scope, opportunity exists for a Systems Programmer skilled in operating systems software. Qualifications include 2-5 years experience with CDC SCOPE or NOS internals, including modifications and extensions to improve system capability and stability. Degree in Computer Science, Math or an exact science desirable.

Our Data Center is located in Windsor, Connecticut, a pleasant suburban area offering excellent housing, educational and rcecreational facilities. For immediate consideration, please send your resume and current salary in complete confidence to Mr. H.R. Kain, or call him COLLECT at (203) 688-1911, COMBUSTION ENGINEERING, 100 Lamberton Road, Windsor, Connecticut 06095.

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CSC

PROGRAMMER/ANALYSTS

The System Sciences Division of Computer Sciences Corporation is continuing its expansion by creating additional career growth positions for qualified computer professionals in support of two major projects.

AIR TRAFFIC CONTROL SYSTEMS

Current opportunities for key assignments exist for individuals with experience in:

Development of a real-time monitor for IBM 360 multiprocessor configuration – 6-8 years experience with a minimum of 3 years on 360; design, implementation of executive software or operating systems; ALC essential.

System generation and maintenance on OS/360 – 6-8 years experience; 360 systems generation and operating systems maintenance experience required; ALC essential.

Design and implementation of a real-time data base management system – 6-8 years experience, ALC or Jovial preferred, design, implementation or enhancement of data management or data base management systems.

Development of Software System test and validation tools – 6-8 years experience, OS/360, design and implementation of software test tools, ALC or Jovial preferred.

The design phase will require assignment in the Washington, D.C. suburban area for approximately five months and permanent assignment and relocation to Jacksonville, Florida approximately mid-September 1977.

SPACE SCIENCES

Current positions in support of our Goddard Real-Time System, Space Tracking Data Network and On/Off Site Project for the NASA Goddard Space Flight Center require a degree in Computer Science, Math, Physics, Astronomy, Meteorology or Engineering with experience using Fortran and/or Assembly languages on large-scale or mini-computers. These skills will be applied in the following concentrations:

- Telemetry application with multi-computer configuration
- Integration and testing of real-time display software
- Data base management
- Real-time scientific applications
- Network management
- Computer-to-computer communications
- System requirements definition
- Analysis and application of climatological data
- Geometric and wave optics, lens system design and analysis, and optical system modeling

CSC offers a liberal relocation policy in addition to complete benefits package. For immediate attention, please send resume or call:

Staffing Department
Toll Free: 800--638-0842

COMPUTER SCIENCES CORPORATION

System Sciences Division
8728 Colesville Road
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We cover the whole range in EDP jobs . . . you name it-we got one to fit you some place . . . salaries go all the way from a "little" to a "heep" . . . and you can bed down in most any state in the union . . . We even have some in foreign countries like Saudia Arabia, New York City and Iran . . .

So ya'll come on up, ya hear! We're in Suite 1162 at the ADOLPHUS. Give us a call and we'll arrange a confidential appointment for you . . . or if you like, just mosey on over . . . We are only two blocks North of the Convention Center.

NO Pistols or Cussin allowed . . . and please kick the mud off yer boots before walkin in the lobby . . .

EDP Search

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Corner of Commerce and Akard
Dallas, Texas
If you're not planning on attending NCC, please send your resume to:
Bob Cole
EDP Search
A Division of Engineering/EDP Search, Inc.
Personnel Consultants
84 N.E. Loop 410, Suite 124E
San Antonio, Texas 78216

GROW WITH INTERDATA

"We Need 300 Computer Pros, Now!"

This year will be an important one for Interdata, and an important one for you, should you join our team. By the end of 1977 Interdata will grow faster than the industry average of 35%. To meet this goal we will need plenty of additional talent . . . your talent. Now's your chance to find out what it's like to be with a winner, where there's always plenty of room to move ahead.

What does this mean to you? When you come to Interdata you get a whole different feeling. One of being supercharged. Of wondering at 5 o'clock just where the day went. You feel creative. And important. It's great being a part of success, and Interdata is certainly one of the world's top computer companies.

My goal is a big one. Recruit 300 computer professionals in the next four months to help us respond to the growing demand for our products. We have openings in marketing and sales, hardware and software development, systems analysis, and for programmer analysts, hardware engineers and computer technicians.

If you want this to be the first of many important years for yourself, drop me a line and tell me about your experience and plans. In strict confidence, of course. Or call me, Rod Lenniger, collect, at (201) 229-4040

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Going to the NCC? Contact me at Booth #1483 or at our Adolphus Hotel suite.

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Southern Resort Analyst/Programmer

Hi teens

Florida's leading hotel, country club and convention center has an opportunity for a creative Systems Analyst/Programmer for major on-line NCR system with duo programming 256K NCR151 with 128K backup. The successful candidate should know NEAT/3 levels 1&2 and COBOL.

This unique career opportunity offers the prestige and security of a stable, professional environment, attractive benefits, high-level visibility to management, super location.

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COMPUTER MAINTENANCE ENGINEERS

Seismograph Service Corporation, A Division of Raytheon, is principally engaged in both on and off-shore geophysical explorations for oil and gas throughout the world. We also provide related services including well logging and digital computer processing of seismic data, both on and off-site. Our main headquarters is in Tulsa, Oklahoma with many career opportunities available here and overseas including England, Europe and North Africa.

We need experienced on-site Maintenance Technicians to service and maintain 16-bit Raytheon RDS 500 series mini-computers. Must have experience on some type of mainframe and peripherals plus schooling. Must be prepared to relocate.

We offer excellent incomes, foreign bonus and living allowance where applicable plus a very comprehensive fringe benefit program. Send your resume in complete confidence:

Mr. Bill Davis
SEISMOGRAPH SERVICE CORP.
P.O. Box 1590, Tulsa, OK 74102
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COMMUNICATIONS CAREERS

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Computer Data Systems, Inc., is a dynamic Washington, D.C. company dedicated to meeting the needs of business, financial institutions, and government agencies. We are one of the leaders in the rapidly growing computer services field. More and more clients come to CDSI for consultation and programming support. Business and industry need us and subsequently, we need you – the experienced professional. As a diversified company, we can offer outstanding career opportunities in some of the following areas of specialization.

Real-Time Applications

PROJECTS: CDSI has developed an extensive automated communications systems capability. This was acocomplished by carefully selecting top specialists in the field and assigning them to the state-of-the-art consulting and developmental projects. As we continue to expand our capabilities in the field of automated communications systems, outstanding opportunities become available.

POSITIONS: Senior Communications Specialists, Senior Analysts; Programmer Analysts.

QUALIFICATIONS: Experience is desired in one or more of the following areas: ALC, BAL, COBOL, Univac Series 70 or 90/60, Real-Time Communications and Virtual Memory Systems.

In addition to the above challenging assignments, we also have growth opportunities in other areas of expertise. Don't hesitate to call or send your resume.

Enjoy excellent starting salaries commensurate with your experience, company-paid medical and life insurance benefits and tuition assistance. Unparalleled opportunities for growth in professionally oriented Washington, D.C. Send resume or call:

Computer Data Systems, Inc.
7315 Wisconsin Avenue-200W
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ANALYST/PROGRAMMER

Professional position with City of Elgin, Illinois (council/manager form of gov't). Responsible for design and programming of municipal government data systems on IBM 3/15. Knowledge of RPG required. Experience in on-line-systems desirable.

Salary range $15,408–$18,924.

Send resume by June 17, 1977 to:
James C. Aydt
Elgin City Hall
150 Dexter Court
Elgin, IL 60120

Equal Opportunity Employer M/F

SENIOR EDP AUDITOR

We are a mid-size Holding Company seeking a candidate to join our expanding EDP Audit Staff to perform detailed reviews of several different types of Data Processing Installations. Specific responsibilities will include reviews of: data, terminal, program, and physical security; application controls; program development; and the independent development and maintenance of computer audit programs.

Candidates must have a working knowledge of COBOL, IBM Systems and various types of Data Processing Controls. College degree preferred. Experience with a CPA firm and TP/TC a plus. Salary commensurate with experience.

Please send resume and salary history to:
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Asst. Personnel Officer
PHILADELPHIA NATIONAL BANK
Code 2-2-5
P.O. Box 7618
Philadelphia, PA 19101
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QUME Corporation, a manufacturer of nigh speed character printers is one of the fastest growing companies in the U.S. We need a dynamic, take-charge marketing specialist to join our management team as Vice President Marketing. We require experience in the word processing or data processing field, preferably OEM, with a proven ability to design and implement long range marketing plans.

The right individual will have a very strong knowledge of marketing concepts including pricing strategy, competitive theory, and product sales analysis coupled with enough strength, self-assurance and professionalism to open doors to new accounts and to negotiate major deals to a close. You will have full responsibility for the Marketing, Sales, and Customer Support function.

For a personal interview during the National Computer Conference, call Cynthia Bornstein, Corporate Communications Director, in our interviewing suite in Dallas at:

Hotel Adolphus – Commerce at Akard Street
(214) 747-6411

or send resume and salary history to our Headquarters office at:

QUME Corporation
2323 Industrial Parkway, Hayward, CA 94545
(415) 783-6100

TULSA

SOFTWARE PROGRAMMER

We'll move you to beautiful Tulsa, Oklahoma, if you are selected for this challenging position. As software programmer, you'll be helping us install IMS on potentially hundreds of future projects—including national health insurance systems. If you have had formal IBM OS and IMS Internals courses and 3-5 years software experience, then this position is for you.

PROGRAMMER ANALYST

We need several programmer analysts immediately in our expanding EDP shop. We offer a progressive state of the art environment with excellent career paths. If you have 2-5 years EDP experience and IBM 370 OS background with salary requirements to $17,400, then this may be for you.

If you would like to live in Tulsa, Oklahoma, then call or send your resume and salary requirements to:

Art Long
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Tulsa, Okla. 74102
918-583-0861

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PROGRAMMER/ ANALYSTS

NCR Data Processing Division has immediate openings for Programmer Analysts in:

- MIS Applications Programmer
- Software Development
- Firmware
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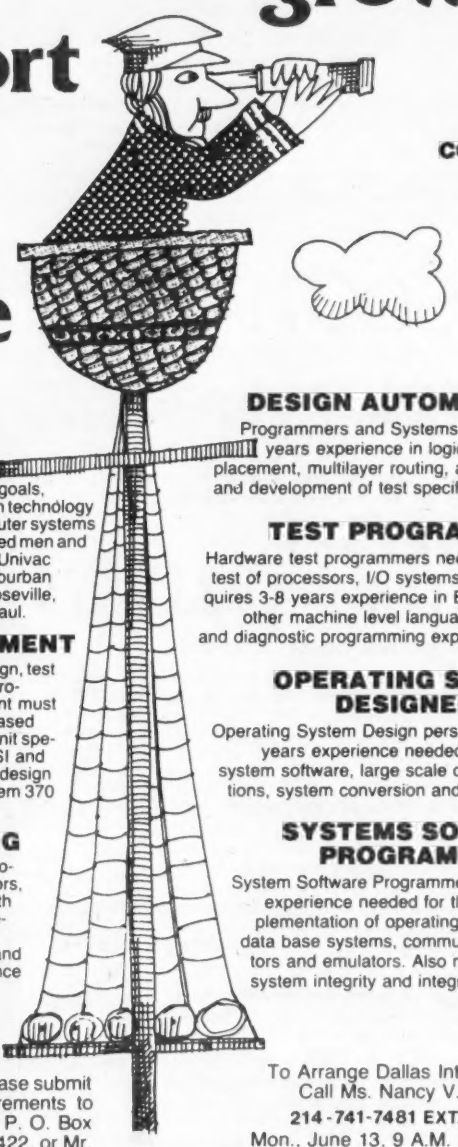

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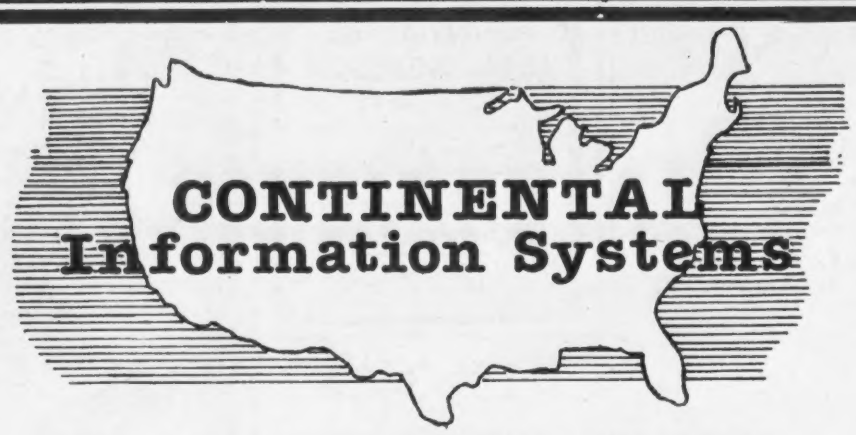

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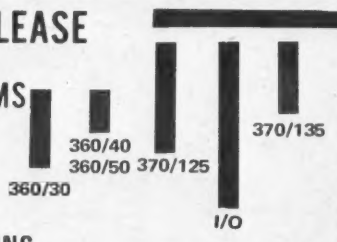

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Sealed bids will be received by the Board Secretary of the Upper Bucks County Technical School, R.R. 2, Box 207, Perkasie, PA 18944, until July 14, 1977, 3 P.M., for the sale of the following equipment:
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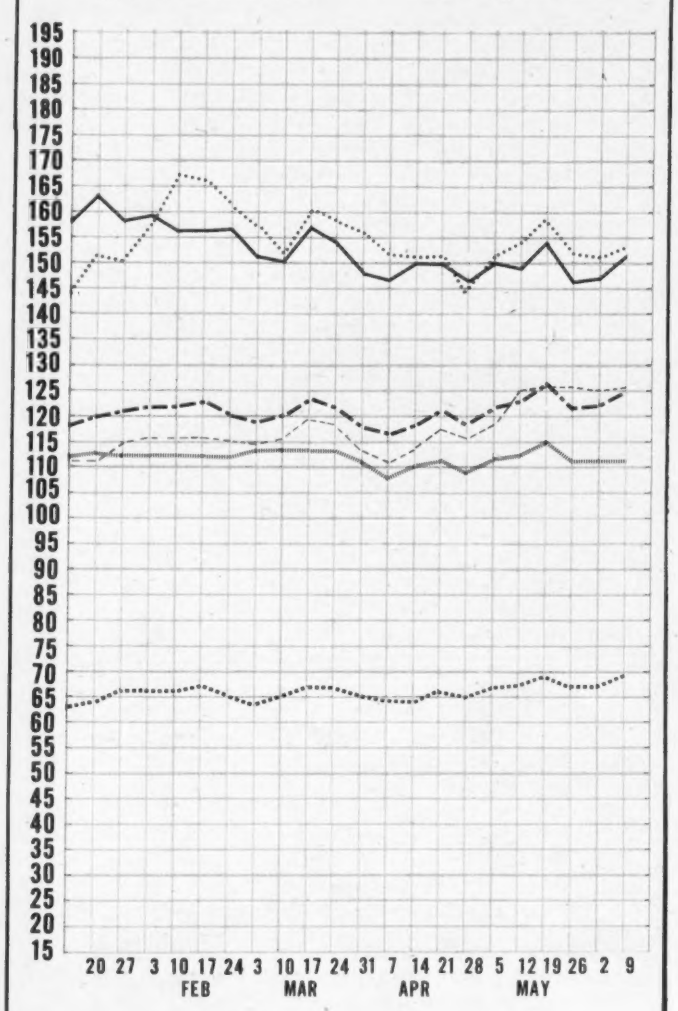

Earnings Reports

HEWLETT-PACKARD
Three Months Ended April 30

	1977	1976
Shr Ernd	$1.13	$.86
Revenue	341,546,000	279,764,000
Earnings	32,084,000	23,771,000
6 Mo Shr	2.06	1.40
Revenue	639,880,000	515,403,000
Earnings	58,142,000	38,847,000

INCOTERM
Year Ended February 28

	1977	1976
Shr Ernd	$1.25	$1.24
Revenue	39,818,000	32,696,000
Tax Cred	.....	276,000
Earnings	2,509,000	2,500,000
3 Mo Shr	.45	.29
Revenue	12,760,000	8,752,000
Tax Cred	.....	83,000
Earnings	915,000	590,000

INFOREX
Three Months Ended April 1

	1977	1976
Shr Ernd	$.14	$.12
Revenue	14,406,000	14,907,000
Tax Cred	79,000	69,000
Earnings	428,000	353,000

LOGICON
Year Ended March 31

	1977	1976
Shr Ernd	$1.50	$.98
Revenue	28,594,000	31,967,000
Earnings	1,301,000	841,000
3 Mo Shr	.32	.26
Revenue	7,056,000	7,661,000
Earnings	283,000	224,000

MATHEMATICA
Three Months Ended March 31

	1977	1976
Shr Ernd	$.22	$.21
Revenue	5,589,900	5,161,700
Earnings	151,900	147,300
9 Mo Shr	.76	.64
Revenue	16,487,500	13,049,300
Earnings	529,800	447,000

NETWORK DATA PROCESSING
Year Ended March 31

	1977	1976
Shr Ernd	$.22	$.30
Revenue	2,863,088	2,257,570
Earnings	135,652	184,220

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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE JUNE 8 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	0- 39	24	+1 3/4	+7.8
N	BURROUGHS CORP	55- 91	58 3/8	+1 1/4	+2.1
O	COMPUTER AUTOMATION	18- 27	26 1/2	- 3/8	-1.3
N	CONTROL DATA CORP	20- 26	20 7/8	+ 7/8	+4.3
N	DATA GENERAL CORP	35- 46	42 3/8	+1 7/8	+4.6
N	DATAPOINT CORP	18- 30	21	+ 1/8	+0.5
N	DIGITAL EQUIPMENT	37- 53	43 3/8	+1 7/8	+4.5
N	ELECTRONIC ASSOC.	2- 3	1 3/4	- 1/8	-6.6
A	ELECTRONIC ENGINEER.	8- 10	8	+ 1/4	+3.2
O	FOUR-PHASE SYSTEMS	13- 17	13 3/8	- 1/4	-1.8
N	FOXBORO	42- 54	50 1/4	+ 1/8	+0.2
O	GENERAL AUTOMATION	6- 9	5 7/8	- 1/8	-2.0
O	GRI COMPUTER CORP	1- 1	3/4	0	0.0
N	HEWLETT-PACKARD CO	69- 87	77 1/2	+3 1/2	+4.7
N	HONEYWELL INC	44- 53	52	+1 7/8	+3.7
N	IBM	245-286	252 7/8	+4 7/8	+1.9
O	MANAGEMENT ASSIST	5- 9	5 1/8	+ 3/8	+7.8
O	MEMOREX	23- 29	23 5/8	- 3/8	-1.5
O	MICRODATA CORP	7- 18	9 3/4	+1 1/4	+14.7
O	MODULAR COMPUTER SYS	5- 8	7 1/4	+ 3/8	+5.4
N	NCR	32- 38	35 3/8	+1	+2.9
O	PRIME COMPUTER INC	12- 17	15 1/8	+ 3/4	+5.2
N	PERKIN-ELMER	17- 21	18 1/4	+1 3/8	+8.1
N	RAYTHEON CO	55- 65	64 3/4	+1	+1.5
N	SPERRY RAND	34- 42	34 5/8	0	0.0
O	SYCOR INC	8- 15	8 1/4	- 1/4	-2.9
A	SYSTEMS ENG. LABS	5- 7	6	0	0.0
N	VARIAN ASSOCIATES	15- 20	19 7/8	+ 3/4	+3.9
A	WANG LABS.	14- 18	15	+ 1/4	+1.6

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE JUNE 8 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COURIER CORP	8- 10	8 3/4	+ 7/8	+11.1
O	COMDISCO INC	10- 13	9 3/4	0	0.0
A	COMMERCE GROUP CORP	2- 2	2	0	0.0
A	COMPUTEK INVSTRS GRP	1- 2	7/8	-	-6.7
M	DATRONIC RENTAL	1- 2	1	0	0.0
A	DCL INC	1- 2	1 3/4	- 3/8	-17.6
N	DPF INC	6- 8	6 3/4	+ 1/8	+1.8
N	ITEL	13- 16	15 3/4	+ 1/8	+0.7
N	LEASCO CORP	19- 24	20 7/8	- 1/8	-0.5
O	LEASPAC CORP	1- 1	5/8	+ 1/8	+25.0
O	NRG INC	0- 0	1/8	0	0.0
A	PIONEER TEX CORP	6- 11	6 3/8	- 1/8	-1.9
N	U.S. LEASING	10- 13	12 1/4	+ 5/8	+5.3

SOFTWARE & EDP SERVICES

EXCH		1977 RANGE (1)	CLOSE JUNE 8 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 3/8	+ 1/8	+10.0
O	ANACOMP INC	7- 9	8 7/8	0	0.0
A	APPLIED DATA RES.	5- 8	8 1/4	+1 1/4	+17.8
N	AUTOMATIC DATA PROC	23- 30	27	+2 1/8	+8.5
O	COLEMAN AMERICAN COS	2- 2	1 3/4	0	0.0
O	COMPU-SERV NETWORK	10- 15	12	0	0.0
O	COMP ELECTION SYSTMS	6- 9	8 5/8	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 7	6 1/8	0	0.0
N	COMPUTER SCIENCES	7- 9	7 1/2	- 1/8	-1.6
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	2- 3	1 3/4	0	0.0
O	COMSHARE	5- 7	5 1/4	0	0.0
O	DATA DIMENSIONS INC	4- 5	3 7/8	- 1/8	-3.1
O	DATATAB	1- 2	1 7/8	- 1/8	-6.2
N	ELECTRONIC DATA SYS.	16- 19	17 1/8	+ 3/8	+2.2
O	INSYTE CORP	2- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/8	- 3/8	-10.0
O	KEYDATA CORP	2- 3	2	- 3/8	-15.7
A	LOGICON	7- 16	14	+1 7/8	+15.4
A	MANAGEMENT DATA	1- 2	1 1/4	0	0.0
A	NATIONAL CSS INC	19- 25	19	- 7/8	-4.4
O	NATIONAL DATA CORP	4- 7	4 5/8	+ 1/4	+5.7
A	ON LINE SYSTEMS INC	17- 22	17	0	0.0
N	PLANNING RESEARCH	3- 5	3 1/2	0	0.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 3	1 7/8	- 1/8	-6.2
O	REYNOLDS & REYNOLD	17- 20	17 1/2	+ 1/4	+1.4
O	SCIENTIFIC COMPUTERS	1- 3	3 3/8	- 1/8	-3.5
O	TYMSHARE INC	14- 20	17	0	0.0
A	URS SYSTEMS	4- 5	4 3/4	0	0.0
N	WYLY CORP	1- 2	1 5/8	+ 1/8	+8.3

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE JUNE 8 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 14	12 1/4	0	0.0
O	ADVANCED MEMORY SYS	7- 9	7 5/8	- 1/4	-3.1
N	AMPEX CORP	8- 9	8 1/4	+ 1/4	+3.1
O	ANDERSON JACOBSON	3- 4	3	- 3/8	-11.1
N	APPLIED DIG DATA SYS	10- 16	13 1/4	+ 3/8	+2.9
O	BEEHIVE INT'L	9- 12	8 1/2	- 1/4	-2.8
A	BOLT,BERANEK & NEW	7- 8	6 3/4	+ 1/8	+1.8
N	BUNKER-RAMO	8- 12	9 1/2	0	0.0
A	CALCOMP	3- 5	2 5/8	- 1/8	-4.5
O	CAMBRIDGE MEMORIES	1- 3	2 1/4	- 1/8	-7.4
N	CENTRONICS DATA COMP	22- 28	28 1/4	+1 1/4	+4.6
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 6	5 3/4	- 1/8	-2.1
O	COMPUTER CONSOLES	4- 7	5 3/4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	3	- 1/8	-4.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	0	0.0
O	COMTEN	9- 13	9 3/4	+ 1/2	+5.4
N	CONRAC CORP	21- 28	23	+1 1/4	+5.7
O	DATA ACCESS SYSTEMS	4- 5	4 1/4	- 1/4	-5.5
O	DATA 100	6- 8	6 1/4	- 1/4	-3.8
A	DATA PRODUCTS CORP	9- 13	11 3/4	+1	+9.3
O	DATA TECHNOLOGY	3- 4	3 3/4	0	0.0
O	DATUM INC	1- 2	1 5/8	+ 1/8	+8.3
O	DECISION DATA COMPUT	2- 2	1 1/2	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 5	4	+ 3/8	+10.3
O	FABRI-TEK	1- 2	1	+ 1/8	+21.4
O	GENERAL COMPUTER SYS	0- 2	1 3/8	- 1/4	-15.3
N	HAZELTINE CORP	9- 12	9 5/8	+ 1/4	+2.6
N	HARRIS CORP	28- 39	37 3/4	- 1/8	-0.3
A	INCOTERM CORP	11- 15	11 1/2	+ 1/2	+4.5
O	INFOREX INC	4- 7	4	0	0.0
O	INFORMATION INTL INC	11- 14	10 1/2	- 1/4	-2.3
O	INTEL CORP	38- 57	46	+3	+6.9
A	LUNDY ELECTRONICS	3- 6	4 1/4	+ 1/4	+6.2
O	MSI DATA CORP	6- 8	7 1/2	+ 1/4	+3.4
N	MOHAWK DATA SCI	5- 8	5 3/8	+ 1/2	+10.2
O	PENRIL CORP	2- 5	4 1/4	- 1/4	-5.5
A	PERTEC CORP	7- 9	6 5/8	- 1/8	-1.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 1/2	- 1/2	-12.5
O	RECOGNITION EQUIP	6- 10	7 1/8	+ 3/4	+11.7
O	SCAN DATA	1- 2	1 1/2	- 1/8	-11.1
O	STORAGE TECHNOLOGY	10- 13	13 1/4	+ 5/8	+4.9
O	T BAR INC	7- 10	9 1/4	+ 1/4	+2.7
O	TALLY CORP.	4- 6	4 1/4	- 3/8	-8.1
O	TEC INC	7- 10	7 7/8	- 3/8	-4.5
N	TEKTRONIX INC	29- 34	34 1/4	+ 5/8	+1.8
N	TELEX	2- 3	2 1/2	0	0.0
O	WILTEK INC	1- 1	1/2	+ 1/4	+100.0

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE JUNE 8 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 7/8	0	0.0
A	BARRY WRIGHT	10- 14	12 1/4	+ 5/8	+5.3
O	CYBERNATICS INC	1- 1	1/2	0	0.0
O	DUPLEX PRODUCTS INC	14- 18	16	- 1/2	-3.0
N	ENNIS BUS. FORMS	6- 7	5 5/8	- 1/4	-4.2
O	GRAHAM MAGNETICS	11- 14	13	0	0.0
O	GRAPHIC CONTROLS	15- 18	16 3/4	0	0.0
N	3M COMPANY	48- 56	48 1/2	- 3/8	-0.7
O	MOORE CORP LTD	29- 37	28 1/2	-1 1/2	-5.0
N	NASHUA CORP	16- 22	20 1/4	+ 1/2	+2.5
O	STANDARD REGISTER	18- 24	22 3/4	- 1/2	-2.1
O	TAB PRODUCTS CO	13- 17	15 3/4	0	0.0
N	UARCO	19- 22	19 7/8	0	0.0
A	WABASH MAGNETICS	10- 15	14 5/8	+1 1/4	+9.3
N	WALLACE BUS FORMS	17- 21	17 5/8	+ 1/8	+0.7

EXCH: N=NEW YORK; A=AMEPICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

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